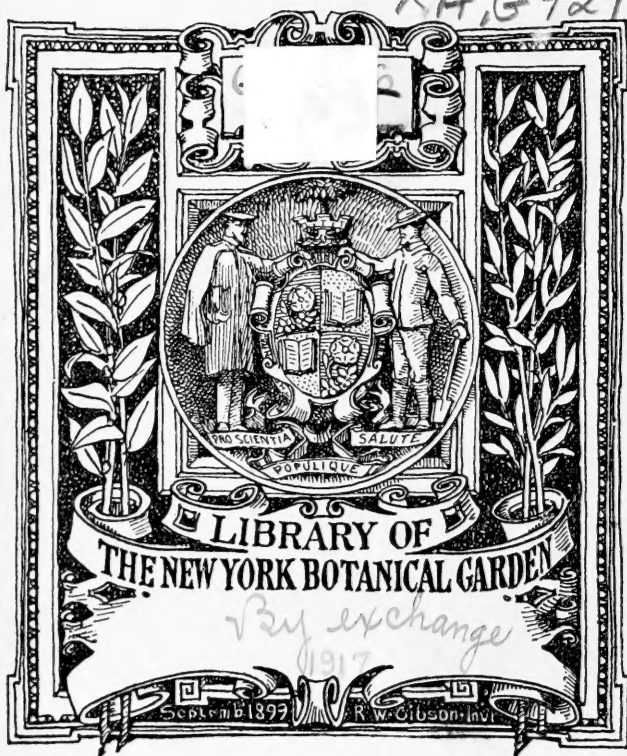
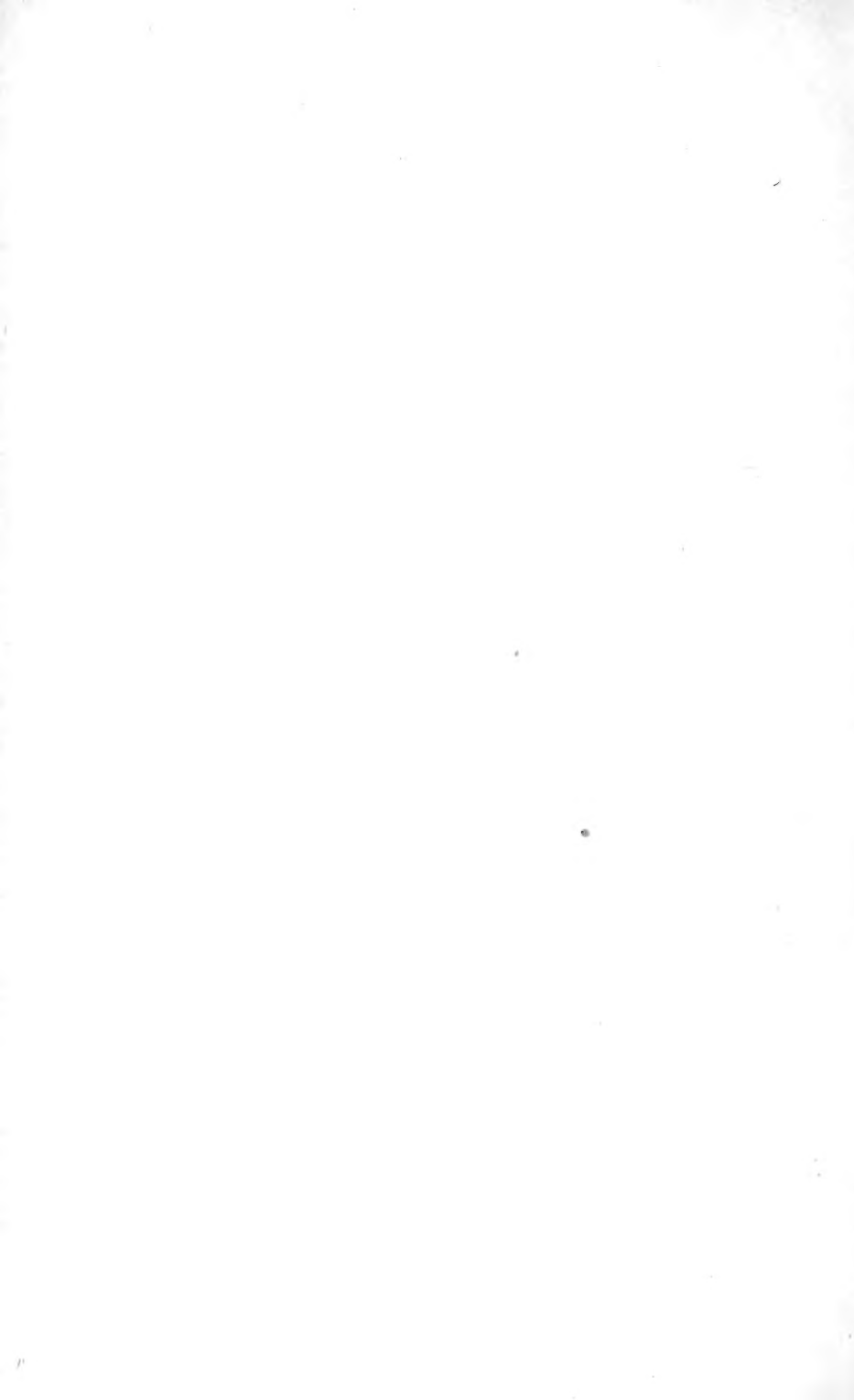


REPORT
OF THE
AGRICULTURAL
COMMISSIONER
—
MAINE 1946

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General view of a portion of the Exhibits at Portland City Hall, Nov. 14-16, 1916.

AGRICULTURE OF MAINE

FIFTEENTH ANNUAL REPORT

OF THE

COMMISSIONER OF AGRICULTURE

OF THE

STATE OF MAINE

1916

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DEPARTMENT OF AGRICULTURE.

*To His Excellency, Oakley C. Curtis, Governor of Maine, and
Council:*

I herewith submit my second annual report as Commissioner of Agriculture of the State of Maine, for the year 1916, in compliance with Chapter 34, Section 9, Revised Statutes 1916.

WILLIAM T. GUPTILL, *Commissioner.*

Augusta, December 31, 1916.

ANNUAL REPORT OF THE COMMISSIONER OF AGRICULTURE.

The year 1916, so far as climatic conditions are concerned, has been even more severe upon the producing community than was the year 1915. The extremely wet weather in the early spring, which prevailed throughout the entire southern section of the state until well into August, made the planting of hoed crops a matter of so much uncertainty that farmers generally confined themselves to the smallest possible areas. This weather was identical with that throughout the northern states as far West as the Mississippi river, except that in June the western states became changed from flood to drouth, and in many states the crops were ruined by dry rather than wet weather.

It is, however, with a good deal of satisfaction that I inform you that the small crops produced have netted the producer considerable more money than any preceding year's crop. The wonderful county of Aroostook this year, as last, was exempt from the ravages of the storm in the early part of the season, and did not suffer materially with drouth throughout the entire year. About 65 per cent of a normal crop of potatoes was raised and more than that of oats and wheat.

Potatoes have sold for an unheard of price all through the season, beginning at the unusually high figure of \$2 per barrel. This means that, after two or three years of misfortune, either owing to an excessive crop and low prices or a short crop and high prices, the average Aroostook farmer will be in a position to square himself with the world, and have something to the good. The southern part of the state suffered, as I have said, very materially from weather conditions, but even then the prices are sufficiently high so that with even an exceedingly small crop more money is being received than with the bumper crops that have frequently been sold at a loss. Less fertility is being sold from the soil and less work is required to handle

the crop. It seems that the arguments are entirely in favor of small crops, from the standpoint of the producer, rather than of large crops, because large crops mean small prices. It means the taking of less fertility from the soil and shipping it to market, in the shape of foods which cannot be replaced in the shape of fertilizer or fertilizing material, for the amount of money that is frequently received for the food itself. This is indeed regrettable, but regrettable as it is, it is a fact that the agricultural community usually suffer with feast or famine. Diversify their crops as they will and use all the foresight possible, not only to meet the market conditions, but to meet current expenses, and still they are defeated, owing to the fact that the consuming population, as soon as potatoes rise in price, look for vegetables in the shape of cabbage, turnips and beets. Thus the market moves, back and forth, up and down, each article of food taking its turn as the supply increases or decreases, by the evasion of the consumer upon the cheapest food commodity. This uncertainty in the market, added to the requirements of producing the crop, weighs heavily upon the agricultural community. Most farmers desire, and desire only, that their crops shall be sold at a profit at the time of its harvest, or a little later, without gambling with the necessities of the consuming public. If, however, it is sold, the speculator makes upon the commodity whatever profit he can and has the added advantage of acquainting himself with the avenues through which this produce reaches the consumer. The next season, this same speculator, more certain of his position, owing to the fact that the information relative to the market conditions and market people are his instead of the producers, bids lower for the crop than its actual cost. This condition would invariably prevail were it not for the fact that the farmers had taken pains through different organizations and associations to inform themselves relative to market conditions. This is the excuse for the Department of Agriculture having allied with its force a bureau of markets.

The activities of the Department have been running at full swing, and every effort has been made by all of the attaches to respond to the demands of the public. These activities are conducted under the various bureaus—markets, horticulture, seed improvement, inspection, weights and measures, dairy.

gypsy moth work, and, finally, the milk inspection. Each department has attempted to accomplish the work that was evidently designed for it to do, by the legislature that made its appropriation. This has been without fear of any consequences and without favoring any individuals.

BUREAU OF MARKETS.

The bureau of markets, during the year 1916, has been under the capable management of F. L. Hutchinson of Dexter. Mr. Hutchinson has been a very valuable man in this place, paying close attention to the conditions which would affect price, and notifying the farmers of what the market conditions were and what they might expect for price, even before they were ready to market their crops. He has also made himself familiar with conditions not only in the large markets of Boston and New York, but also with seed trade conditions in the South. Probably no man in New England is as well equipped to advise relative to the potato trade at the present time as is Mr. Hutchinson. His information in every case has been given to the public through newspaper articles and circular letters to different parties who have sought his advice.

There is little doubt of the value of the work of the organization of the Farmers' Union. I want to recommend to the serious consideration of the members of this organization, making preparations for handling whatever output the farmers in their immediate vicinity may produce, and handling it not only locally, but disposing of all the surplus for these farmers, if there is any surplus. I apprehend that if there was a ready market for all of the produce which any community could and would willingly raise, that there would be enough raised to make any community in the state forehanded and thrifty. It is necessary, however, for the different Farmers' Unions to adjust themselves to what the community already raises, rather than to demand that the community in which it is located change its method of farming, or that it take up crops that it does not already produce. If a Farmers' Union in a town the size of Newport, or even in larger places like Waterville and Auburn, were to purchase the milk routes from the local milk dealers, and make enough to pay the expense of delivering and a small

income besides, they have gone a long way toward winning the confidence of not only the people of the village, but the people on the farms surrounding it as well. This organization, necessarily, would have to instruct the farmers who supply them with milk, under what conditions the milk should be produced—such conditions as the farmers can comply with without putting them to extraordinary expense. If the local milk routes were owned by the different Farmers' Unions in the different parts of the state, and run in connection with the store, the store itself paying a small profit, and the milk route paying a small profit, it would then become an easy thing, and follow naturally as a part of the business of this concern, to collect and ship the surplus product from that locality. It is, however, unreasonable to suppose that any farmers' organization that handles only a part of the farmers' produce can win the confidence of the farmers of the state. It is absolutely necessary that the drudgery attached to all of this work be done, and that it be done openly, so that no one can say that there is an element of crookedness entering into the transactions. This having been accomplished, the Farmers' Union is on the road to ultimate prosperity.

HORTICULTURE.

The work of the Bureau of Horticulture has been under the management of C. L. Wilkins, who has been ably assisted by S. H. Eaton. The regular routine work of the department has been promptly and efficiently attended to, and, together with this a new departure has been made, calling the attention of country and city dwellers to the beautifying of grounds around their homes. This has met with a response that this department hardly expected.

SEED IMPROVEMENT.

The Seed Improvement work for 1916, as in 1915, has been under the able management of E. A. Rogers. This work I had hoped this year to make self-supporting, but I found that it was impossible. I feel, however, that the work should be continued, even if it has to be continued as at the present time, or that a special appropriation be made for it. The importance of the work can hardly be overestimated, and especially is this

true of those people who are attempting to market seed potatoes in the South. I find a continual inquiry from every source, asking for these disease-free seed, and lauding the results that they have obtained by using it. The potato seed trade for the State of Maine is one of the big items of our potato industry, and every effort should be made, not only to encourage its growth for shipment abroad, but for its use at home, for what is good for other sections of the country is especially true of our own. Less attempt has been made to improve the seed of other crops; field corn has been largely replaced by sweet corn and the packers themselves prefer to furnish their own seed sweet corn. With oats this work is being done by developing new and more prolific varieties, and is conducted by the Experiment Station. This work has not received the attention in the past that its merit demands. I have attempted to systematize it, and have succeeded in doing so to a great degree.

BUREAU OF INSPECTION.

The bureau of inspection has been under the able management of A. M. G. Soule, who has been chief of this bureau since its creation. This Department has widened its scope so as to undertake work that is of the greatest importance to all consumers of food. It has also broadened and paid more attention to plant food, inasmuch as the inspection of fertilizer is under this bureau. The unfortunate conditions that we found prevailing in the fertilizer situation in 1915 has been very much corrected in 1916, and the brands of fertilizer for sale in the State of Maine have been more nearly in compliance with the guarantees that are found upon the outside of the package than ever before. The law specifies that the guarantee shall be upon each package. Heretofore, ten packages have been broken for a sample; during the past year but one package has been broken for each sample. The manufacturers felt as though this would work a hardship on them, but we are glad to notice that, in almost every case, the analysis has equalled or exceeded the guarantee. The former method of forwarding these samples to the Experiment Station with the name of the manufacturer and the guarantee that was given on the package has been discontinued. It seemed to me proper to withhold this informa-

tion until after the analysis had been made, consequently this method has been adopted, and with the most beneficial results.

As long as the amount of fertilizer continues to be as large as it is, and the farmers place as much dependence upon it to assure a crop as they do at the present time, it is the duty of the state to see that nothing but the very best goods are sold. This becomes increasingly difficult inasmuch as there are new ingredients being used for fertilizing purposes. I would again call attention to the fact that the price of fertilizer in the State of Maine is considerably more than it is outside of New England. In fact, it reaches to such a high figure that it is a question whether there is not some agreement between them that losses made outside of New England shall be recouped here. I would recommend this year, as I did in 1915, that one of the conditions of registration be, that fertilizer shall be sold in Maine as cheaply as in any place, and, in case of violation of this act, that the registration be liable to cancellation.

The work done by this Department in connection with the Federal pure food inspectors along the coast, in the sardine factories during 1915 and 1916, have had very marked results in the improving of conditions surrounding the packing of this important product of our seashore. During the blueberry packing season of 1916, also, an inspector was assigned to the duty of looking after the packing of blueberries, and the condition surrounding the blueberry packing factories have also improved materially. This has been done without making the work of this department especially obnoxious or onerous to even those whom it most seriously affects.

CYANAMID.

It has become decently well established that cyanamid cannot be used promiscuously as a source of nitrogen in fertilizer, and then, not unless the buyer is advised that if this ingredient comes in contact with the seed, that it is liable to destroy it, with the consequent loss of missing hills. On the other hand, it seems to me that this stuff should be sold for exactly what it is, with the full understanding that it cannot be applied in any way so that it comes in contact with the seed, but that it can be broadcast and worked into the soil without injury to the crop

about to be planted. It seems to be at the present time the cheapest source of nitrogen, and when the government plants get to making this for the market, we may well hope that it will be widely and extensively used. The idea that cyanamid cannot be used in large quantities is wrong. It can be used, but it cannot be used in a drill, but should be broadcast. Cyanamid is made by burning the other gases out of the air and leaving the nitric acid. This is done by an exceedingly hot electric flame, flashing from one point to another. The resulting nitric acid is held by compounding with calcium carbon. When this is completed the substance becomes very annoying to animal life of all kinds, on account of its alkaline properties, and its application to the land would necessarily have to be made with machinery. Cruder methods would not be satisfactory on account of exposing the individual altogether too much to the effects of this alkaline substance. It is time for farmers to seriously consider the use of this substance as a fertilizing material, and I would recommend that they purchase the chemical as a chemical and at once begin to experiment with its use on the various crops, even including hay. It is unsafe to use this, as has been demonstrated time and again in commercial fertilizers mixed in larger quantities than fifty pounds to a ton, where the fertilizer is liable to come in contact with the seed in the drill.

POTASH.

The abandonment or practical abandonment of the use of potash for the last two years should cause the farmers to seriously consider what that means. If crops can continually be grown without the use of potash, it would be a waste of money to purchase potash. It has been part of our agricultural education for a long series of years, that potash was one of the elements that must be supplied for crops to do their best, and the entire absence of potash from the soil would mean that there would be no crop at all, and no vegetable life. During the past year or two, however, with the potash entirely eliminated from the fertilizer, we have seen fairly good crops raised. The thing that concerns us most is, that farmers may get to thinking that the story about potash has been a humbug and abandon the use of it in the future. Such a course would

be an unfortunate thing for the agricultural community, because, if our education amounts to anything, it is a well-established fact that potash is an absolute necessity, and until this is disproven, the crop is taking from the ground the surplus that has been stored there, and which will mean, if continued, the absolute exhaustion of potash from the soil. This ultimately must be replenished from some source. I do not believe that we can afford to disregard potash, if it becomes commercially possible to use it.

BUREAU OF WEIGHTS AND MEASURES.

The bureau of weights and measures was administered during the first part of 1916 by E. A. Russ of Dexter, who acted in that same capacity in 1915. He proved to be an efficient official, so far as the testing of weights and measures was concerned, and worked harmoniously with the local sealers, but, owing to an unfortunate character, he got to that place where it was impossible to allow him to take the initiative without first examining the ground myself. After a sufficient number of trials I dismissed him and appointed in his place Percy C. Edgecomb of Belfast, a former local sealer in that city, and a man of high character, who fully understood the work before he came to the department. Under his management I was relieved from many of the minor duties of this office.

DAIRY BUREAU.

J. H. Blanchard of Auburn has done the work in this bureau in 1916 the same as he did in 1915. His work has been not only to speak before granges and breeders' meetings, but to visit individual farms which, although very much slower in its susceptibility, leads to many valuable suggestions to dairymen.

GYPSY MOTH WORK.

The Gypsy Moth work has been under the management of E. J. Cady, field agent, Portland, during 1916 as it was in 1915. The breeding of parasites has advanced to such a stage and the growth of the parasites has increased to such an extent that not a single newly infested town was located in the state during the year. In large portions of the State of Maine, the

parasites that bred both upon the brown-tail and gypsy moth have nearly exterminated the brown-tail moth.

MILK INSPECTION.

The state milk inspection has been under the charge of C. W. Wescott of Patten. In the inspection of milk there is a chaos of inspection, and it is little wonder that the number of cows have dropped off as they have in the last few years, and the tendency today is for fewer cows, a large part of which is due to this chaos. We have in the state today four distinct and separate inspections of milk. First, there is the Department of Agriculture, with its state-wide authority and its own standards. We next have the town or city inspection which does not coordinate with the Department's inspection, except by mutual agreement. We have also a Board of Health inspection, in places where they are sufficiently aspiring to attempt this work, and, lastly, we have inspectors in this state from the city of Boston who are forbidding the shippers to purchase milk from this man, that man, or the other man, as suits their taste or fancy, with no authority whatever, and with no recognized standards, whatever. Now, is it any wonder, with these various inspections, that the potato acreage and crop acreage increases and the livestock industry languishes? It seems to me that the legislature ought to coordinate all of the other inspections, excepting that from Boston, and they ought to forbid that. If Boston does not want our goods as they come to their door, they can reject them when they do come. They do that to our potatoes. The State of Maine does not inspect anything that comes from Boston. I believe in reciprocity. So far as the Board of Health inspection is concerned, I apprehend that the extraordinary powers given them are not for the inspection of food products, but rather for the purposes of suppressing epidemics, contagious and communicable diseases. So far as milk is a source of contagion for such diseases as typhoid, scarlet fever or diphtheria, I would give the Board of Health unlimited power to constrain and condemn it until such a time as it was fit for human food. It is hardly supposable, however, that this unusual power would be given to a Board of Health to rid a community of food that at most is only un-

palatable. As far as the city milk inspector and the state inspector are concerned, they should be more closely coordinated than at the present time. I think it would be safe to remove all food from the possible inspection of a Board of Health and have an organized food department which should embrace milk, meat and other foods, except, as I have previously said, in cases where contagion occurs, and have the Boards of Health attend strictly to business.

LIVESTOCK INDUSTRY.

There is, furthermore, always this to consider, that it is desirable that more livestock be kept in order that the hay and roughage be consumed, and the fertility returned to the farm. It is, however, not very encouraging to the man who attempts to raise livestock, either for beef or for dairy purposes, to find that his market is controlled by the packing houses of the West. Such, however, is the case. It has been the policy of the packing houses to conduct a campaign in a clandestine way to create the impression in the minds of milk and butter consumers that milk is not fit for human consumption. Incidentally, this creates a protest against butter and, the greater the protest against butter, the more oleo is consumed, which the packers themselves manufacture, and profit by its sale. This campaign manifests itself from sources that one would little expect. The teachers of domestic science, for instance, have assiduously taught that oleo is just as good as butter, and have disseminated this information before every audience that they could. They, too, are affected with the propaganda which has been so rampant in this state recently, that milk is dirty and unfit for food. They forget that this is the first thing that many and many a baby takes into its stomach, and continues to live and thrive upon until it becomes old enough to assimilate solid foods. This is not only so now, but has been for time immemorial, and it is remarkable to hear city dwellers speak of milk which is much more cleanly than it used to be, as though it was not fit for food. Wonderful things, however, happen. Factories are putting on the market, milk made into malted or evaporated product. This milk is raised from cows under ordinary conditions; it is drawn from the cow under ordinary conditions. It is then taken to the factory and doctored, dried,

salted and canned. It may bear upon its label the picture of a healthy looking baby. It is then shipped to the market and put on the shelves of stores to be sold. Does anyone imagine that this milk's cleanliness and wholesomeness are increased by the different manipulation that it passes through?

CREAMERIES.

It does not usually seem to be understood by the farmers or anyone else in the State of Maine, that the creamery that we used to know, that collected cream and made butter for the market, has almost entirely disappeared, and in its place has arisen a chain of creameries, so-called, that collect milk or cream that is sweet and ship it as such without manufacturing it into butter. There are annually shipped out of the State of Maine between 4,000 and 5,000 cars of milk and cream. During this year two important phases of the milk situation have manifested themselves. The first was when Vermont shippers to Boston asked that a uniform rate be established on milk from the point of origin to the point of destination. The railroads immediately assumed that this was an excellent opportunity for an increase in the freight rate, and applied to the Interstate Commerce Commission for an increase of their rate on milk and milk products. At once the agricultural societies and the farmers individually interested themselves in this case before the Interstate Commerce Commission, which is now commonly known as the New England Milk Rate Case. The railroads claimed, first, that they needed the money and, second, that milk was not paying its proportionate share of the freight rate. A strenuous opposition was put up by the producers, and both of these propositions were demonstrated to be contrary to the fact. A study of the situation, however, revealed that it was necessary to change the methods of shipping milk throughout New England to Boston, and also to the other large consuming centers like New York, Philadelphia, Baltimore, Chicago, Cincinnati and St. Louis. The Interstate Commerce Commission, after making an extensive study of the different conditions prevailing, established a uniform rate, and it is now to be hoped that no advantage lies with anyone along this line, and that farmers can now produce milk with the certainty

that their freight rates will not be continually tampered with, but that they will be upon a stationary and satisfactory basis. Later in the season the producers demanded more money for their milk and after a severely waged war they obtained a victory. This has also encouraged the milk producers to such an extent that they have organized throughout New England in local units, and it is to be hoped that they will in the future have something to say relative to the price that they will receive for the product of their dairies.

FAIRS.

The fairs in the State of Maine at the present time are of two kinds; those known as special appropriation fairs, and those that draw from the general state stipend. The special appropriation fairs are the Maine State Fair at Lewiston and the Central Maine Fair at Waterville, each of which gets \$2,500, and the Eastern Maine State Fair at Bangor, which, by special appropriations, gets \$1,750. Besides these, there is two cents for each individual in the state, appropriated for a stipend fund to be divided upon a pro rata basis for every fair that is legally organized, under Chapter 51, Revised Statutes of 1916. Some of these fairs are worthy competitors, if not equal, to the state fairs, and their stipend, on account of the amount of premiums awarded, is almost as large as the state fairs. From these they range to a few dollars—forty or fifty. There seems to be no system of holding the fairs, and no accomplishment, except of a minor nature, besides the distributing of the funds raised by gate receipts or by appropriations. I think this is wrong. It would seem to me that the minor fairs should be held first, whereas, under the present arrangement, they are held last. Being held first, I would require that those who receive premiums, enter this same produce in competition at the big fairs, and that the big fairs be not burdened with exhibits that had not received a premium from some of the smaller fairs. This would mean that, instead of the large fairs being held first, as at the present time, the small fairs would be held first and the exhibits should be brought in from the neighborhood from the small fairs, that those which received a prize should be forwarded to the large

fairs, which would necessarily mean that the large fairs must be held later in the season. This might and would upset the present tendency of the state fairs which, at the present time, depend more upon their horse trots and vaudeville to draw a crowd than upon their agricultural exhibits; but the trotting horse industry in the State of Maine at the present time is not what it used to be, and it is not for the purpose of encouraging breeding establishments for the raising of trotting horses, but for the excitement of the race itself. It is a subject that is widely discussed just now, how to handle the fairs most profitably for the community which they serve. The above would be my recommendation.

FARMERS' INSTITUTES.

The Farmers' Institutes have been conducted this year, as previously, according to law. We have had all of the experts that we had in 1915, namely: R. G. Hynicka of Lebanon, Penn., who spoke upon "Horse Breeding"; George V. Smith of West Willington, Conn., who spoke on "Poultry." These are the best two authorities on their subjects in the United States. At the fall institutes we had Miss Margaret Mahaney of Concord, Mass., the most successful breeder of turkeys in the eastern part of the United States. She has come to be recognized as one of the foremost authorities on this subject, in this or any other country. It has been one of my ambitions to reestablish the turkey raising industry in the State of Maine on a basis where it can furnish at least our own people with their Thanksgiving dinners. In the past twenty years the turkey has dropped completely out of sight, and there are only a few in the entire state, and these are kept for ornamental purposes rather than for utility purposes, or have been until the past two years. The efforts of Miss Mahaney have resulted in large flocks being grown; the largest which has come to my attention is at Jackman, where 140 were raised in one flock. In addition to the foregoing subjects, the members of the Department have spoken upon the work that we are trying to do in the state, which is distinctly state work, and this is especially true of the Seed Improvement Work.

SHEEP.

In the State of Maine at the present time there are scarcely one-seventh of the sheep that there were forty years ago. At one time, in the State of New York, there were 6,500,000 sheep. At present they have about 500,000. It is true that at the time New York had 6,500,000 sheep there was no such place as Montana or Wyoming in the business, and but little was known about Texas. The vast ranges of the West where sheep could be produced for practically nothing, upon the wild grass of the plains, gave the first shock to the Eastern sheep growers, but this was not the worst blow to the industry. There was a time when sheep had a three-fold value. Their tallow was absolutely essential for light, their wool could not be dispensed with for cloth, and their meat was an acceptable food. Today, the tallow has absolutely disappeared from the market as a lighting product, and wool has become of very much less importance since cotton manufacturers have demonstrated again and again that the flannel made from cotton is as acceptable as that made from wool, and almost as warm. It is supposable that the sheep industry may drop back to a place very much inferior in the agriculture of the future to what it has been in the agriculture of the past. It is a fact that sheep enthusiasts believe that sheep will again become one of the dominant animals of the livestock industry. I hope this industry will advance from the place it now holds to one more prominent. It does not, however, seem consistent that it should. Temporary causes have again and again been alleged for this declining, such as destruction by dogs, or some other cause, but I do not feel as though these grounds were well taken.

INSPECTION OF PETROLEUM PRODUCTS.

At a meeting of the National Commissioners' Association it was my pleasure to learn that the State of South Carolina inspects petroleum products, the largest of which, at the present time, is gasoline. They use as their standard the German residuary test that there shall not exceed eight per cent of kerosene in the gasoline of commerce. Our gasoline sold in the State of Maine contains from 43 per cent to 48 per cent kerosene. This affects every phase of trade and manufacture

at the present time—not only the man who uses an automobile or rides in a naphtha launch, but also the man who runs a gasoline engine for sawing wood or threshing grain. The efficiency of gasoline is largely increased in having the kerosene decreased to eight per cent. I would recommend that the inspection of petroleum products be added to the Bureau of Inspection.

PRACTICAL HOUSING FOR THE DEPARTMENT.

The analysis work of the Department of Agriculture is now, and has been done for a series of years, at the Experiment Station, Orono. There was considerable talk at the last legislature about erecting a building on the southwest corner of the State House grounds, suitable for a laboratory. I neither favored nor opposed this because I was not familiar enough with the subject to pass an intelligent opinion upon it. I soon learned, however, that the Experiment Station is supported by three appropriations—two of them federal, viz.: Hatch and Adams funds, and the third by the Department of Agriculture. The Department of Agriculture, during 1915 and 1916, has paid nearly \$12,000 a year, in round numbers \$24,000, for having its analysis work done by the Experiment Station. I have felt chary about dipping into their affairs and dictating who should do it and what the price paid should be, owing to the fact that I would have been accused at once of introducing politics into the Experiment Station. I have felt, however, that the work could be and should be done very much cheaper. For instance, the director of the Experiment Station receives \$4,000 a year, one-third of which the Department of Agriculture pays, \$1333 a month; the chief chemist receives \$2,500 a year, or \$208 a month, all from the Department; the assistant chemist, Mr. Hanson, receives \$2,000 a year or \$166.67 a month, also from this Department. Now, as I understand it, Mr. Hanson has absolute charge of the work of the other assistants of which there are two, one being paid \$600 and the other \$700 a year. Mr. Hanson takes off his coat and enters actively into the work. The men who lend us the grace of their names, viz., Dr. Woods and Dr. Bartlett, together get \$319 per month. The three men who do the work together get \$275 a month. It is a question if one man actively engaged

in the laboratory with two assistants, cannot do all the work of the Board of Health besides, although I am not speaking for the Board of Health, as I know very little of their requirements. As it is, the Board of Health at the present time runs a laboratory separate and independent from the Experiment Station. I believe that the idea of erecting a building on the southwest corner of the State House campus for the accommodation of the laboratory and the Department of Agriculture can well be considered along economic lines. I further believe that it would greatly strengthen the confidence the people would have in the Department of Agriculture. The bringing of the laboratory to Augusta and combining it with the laboratory of the Board of Health would make the Department more compact and efficient. The saving made under a single administration would almost or quite pay for the building and would make this important work respond to the demands of the people.

CONCLUSION.

In conclusion I would like to make acknowledgments to the Agricultural Societies who have worked earnestly for the advancement of agricultural conditions and in perfect harmony with the Department of Agriculture; to the granges, both subordinate and pomona, who have been of so much assistance to the Department with their organized forces throughout the state, enabling us to reach audiences with little effort except to respond to calls from them; to my capable assistants upon whom I have leaned for help to an extent that no one can appreciate; to the stenographers of the Department who have given the written word of our actions and ambitions to the public, and, finally, to the governor and council from whom nothing but assistance and the most courteous treatment have been received.

REPORT OF STATE DAIRY INSTRUCTOR.

To the Hon. W. T. Guptill, Commissioner of Agriculture:

The report of your Dairy Instructor for the year 1916 is hereby respectfully submitted.

A continued study of the conditions under which the dairy products of Maine are produced and sold has been made with the hope of thereby enabling the dairymen to secure a larger net financial return from their herds. After a careful investigation I believe that over one-half of the dairy products of Maine are produced at a loss. The price received is not commensurate with either the cost of production or the intrinsic value of milk as compared with other foods. The use of oleo-margarine largely governs the price of dairy products and I shall be greatly interested in the report of the committee appointed at the last Dairy Conference to ascertain the State institutions that use this substitute for butter.

The dairymen justly feel that the institutions they help to support should not assist in keeping the prices of dairy products down by the use of any substitute for the product of their herds. The cows in Maine have steadily diminished for the last decade, and they will only come back when there is a living profit in the business.

The dairymen buy their supplies and sell their products to firms that are well organized for their mutual protection and yet the dairymen themselves have never felt the need of organization. I sincerely hope that the dairymen of Maine will investigate the movement in New England for higher prices for a higher grade of dairy products and render such assistance as they feel is needed for the improvement of the dairy interests of the state.

I have visited during the year over 200 dairymen at their homes and, without exception, they have been anxious to gain information and willing to profit by any suggestion I was able to make. They were advised, as last year, to keep better cows

and feed more economically by having a better knowledge of dairy rations. I believe more have kept records of the individuals of their herd and more of those that failed to return a profit have been sold. I also believe the high prices for grain have resulted in a more careful study and that a decided improvement in feeding and care has been made during the year.

I have attended 76 meetings, with an average attendance of 92. I have not been able to respond to all the calls for my time and I believe that the Seed Improvement work should be provided for in such a way as to allow, as formerly, the Assistant Dairy Instructor to do the dairy work.

The work of cow test associations has been carried on as last year. It has been hard to find competent testers willing to do the work for the price that could be paid; therefore, several associations have temporarily ceased operations. It is hoped that these associations will soon resume work, as the results obtained from a properly organized association more than repays the cost.

I again desire to express to you my kind regards for the uniform courtesy extended by those connected with your Department; to the press of the state, my thanks for the kind reports of meetings attended; to the University of Maine and Experiment Station, my best wishes for the assistance rendered by those engaged in the work of these institutions; to the granges in Maine, my gratitude for the many invitations to partake of their hospitality which I have so much enjoyed; and, finally, to the dairymen of Maine I desire to extend my appreciation of their forbearance of my efforts expended in their behalf.

Respectfully submitted,

J. H. BLANCHARD,
State Dairy Instructor.

REPORT OF ASSISTANT DAIRY INSTRUCTOR.

To the Hon. W. T. Guptill, Commissioner of Agriculture:

I herewith submit my second annual report as Assistant Dairy Instructor, in charge of the Seed Improvement Work of the state.

At the annual meeting held in Lewiston in December, 1915, the matter of a final inspection of all certified seed was discussed very thoroughly and the general opinion was that no seed of any kind should be allowed to be sold as certified seed without being inspected at the time it went into the container in which it was to be shipped.

This matter being in charge of your Assistant Dairy Instructor, he had used for his guide the methods of his predecessor in office and had, at the time the last field inspection was made, charged a fee of \$3 for tags, as had been done in the past. The payment of this fee for tags entitled all growers, whose crops had passed the field inspections, to them, regardless of any action that might be taken by the Seed Improvement Association, as a whole, or its Executive Committee. However, the association voted, and I was instructed by the Executive Committee, not to issue the blue tags of the association and Department of Agriculture to any grower who had certified seed, unless such seed was inspected at the time it went into the container. I informed the association that no money was available to carry on any further inspection work. However, as it was very desirable to determine whether or not the seed was carefully inspected as to grading, and nothing allowed to go in that was in any way different from what the purchaser would have reason to expect, arrangements were made with Guy Porter of Houlton, vice-president of the association, to have all certified seed around Houlton inspected at the time of shipment. Mr. Porter being assured that if funds could not be had from the Department of Agriculture, such sum as was needed would be taken from the treasury of

the association. With this assurance, Mr. Porter employed Roland B. Hovey and J. F. Hussey, two very careful farmers, to do this work at a total cost of \$32 for the shipping inspection around Houlton.

Some time in June letters were sent to some of those who bought this certified seed from Houlton, which was inspected as it was being sacked, asking for information as to its quality and the apparent results in the field. The letters received in reply were very encouraging. One of these from Frank C. Danser, who buys for the Farmers' Coöperative Association of Mercer county, New Jersey, is as follows:

"TRENTON, N. J., June 17, 1916.

"E. A. Rogers,

"Augusta, Maine.

"*My dear Brother Rogers:*

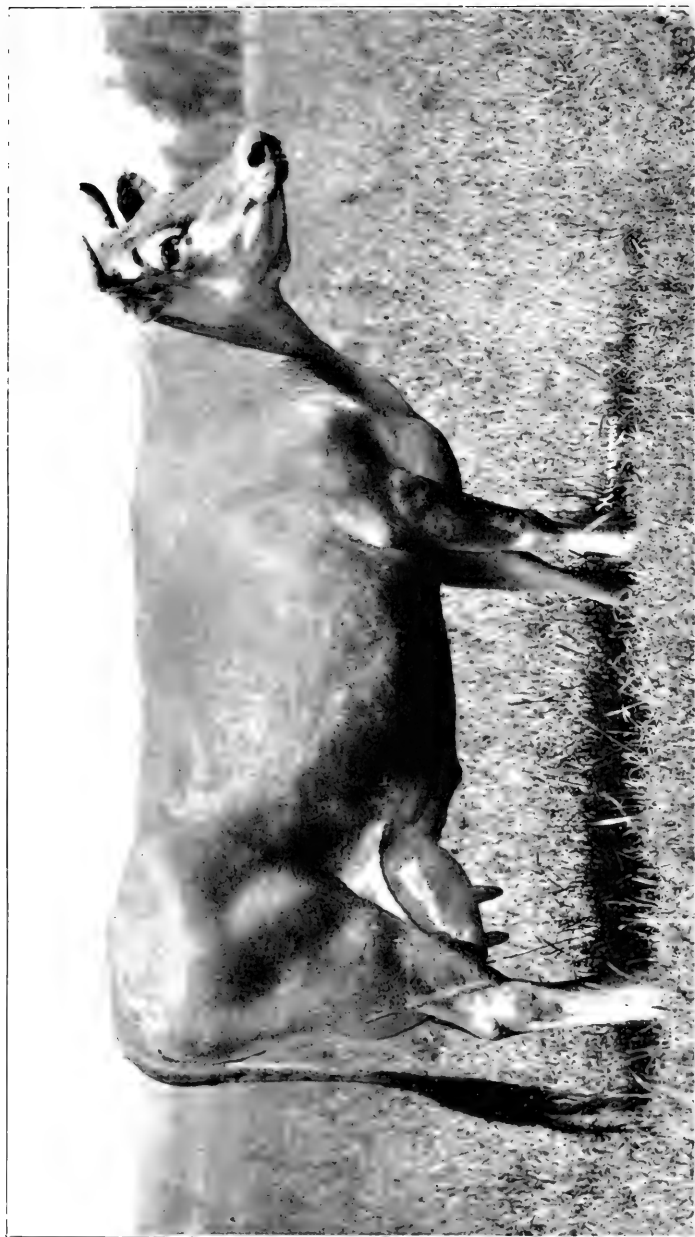
"I note from your valued favor of the 15th, just received, that you are desirous to learn whether the seed potatoes purchased by us last spring from parties in Maine, and the same bearing the certificate of the Maine Seed Improvement Association and Department of Agriculture, were, as a whole, any better than others purchased in your state by this (our) association—or the so-called "selected" seed.

"In reply to this question we can answer it in a word: YES, emphatically YES.

"We might add that, to date, we have received flattering reports *only* from those customers to whom we sold certified seed from the several cars purchased by us thru our mutual friend, Mr. Guy C. Porter. Our only regret is, that all of our seed (of which we had a vast quantity in the aggregate) should not have been measured up to the same standard of excellence.

"We have completed arrangements to hold, on the 21st inst., a public tour of inspection, under the auspices of the Mercer County Farm Bureau, which will include several potato field demonstrations. These auto tours were inaugurated by the Bureau several years ago, and are appealing to the more advanced agriculturists in greater measure on each successive occasion. We hope to have about 500 people out on this occasion, and wish we might number you and Mr. Porter among our midst on this one. If at all possible, please try and arrange to come down later in the season, before the vines break.

"Wish you would try and come down a little later in the season. If you can arrange to leave, even for a brief sojourn with us, I should be delighted to take you over the potato belt within our territorial jurisdiction for the purpose of acquaint-



Lass 69 of Hood Farm, World's Champion Senior 2-year-old.
Record:—Gave 17,793 lbs. 11 oz. milk; 1071 lbs. 4 oz. butter in one year.

ing you with the actual conditions here as they may exist at any given time. I should want you to make my home your headquarters while here.

"Trusting that we may have the pleasure of a visit from you in the not distant future, and with kindest regards to you and yours, I remain.

"Very sincerely yours,

"F. C. DANSER."

In cases where the tags were furnished and the growers allowed to grade their own product, reports were not always so favorable, as several letters came in, criticising quite severely the grading of some lots of seed sent out under the blue tag of the Department of Agriculture and Seed Improvement Association. In some cases samples were sent in, taken from sacks bearing the blue tag, accompanied by the tag taken from the sack. These samples certainly did not speak very highly for Maine certified seed.

It is only fair, however, to state that in tracing these different lots, it was lack of knowledge of how certified seed should be graded and packed rather than any attempt on the part of the grower to put in anything objectionable. There seems to be a lack of knowledge on the part of many of our potato growers as to the proper manner to grade seed potatoes and better grading will naturally come with a clearer understanding of how the work should be done.

The work of seed certification is one that is attracting attention all over the country, especially among those growing seed potatoes. Those having charge of this work in several of the northern potato growing states have written me in regard to the methods we are following here in Maine. Several of the states have intimated that they will use our method as a basis to outline their work along this line. This spring's experience in shipping certified seed showed that if we are to keep Maine's certified seed at the head of the list, an inspection must be made at the time the potatoes are sacked to be shipped. This was an untried experiment, as far as I am able to learn, all over the country and several of the states are today looking to Maine as to the outcome of this work—it being generally believed by all that it would be impracticable and the cost of the work prohibitive.

The work as a whole had gotten into that position where it seemed absolutely essential that it become self-sustaining, otherwise, there could be no appropriation made, even if the legislature was so disposed, which would come reasonably near the exact amount needed.

Weather conditions are a large determining factor as to the acreage entered from most of the state, and a fixed sum of money, which might be adequate one season, would be totally insufficient the next—caused by weather conditions alone. Therefore, a schedule of prices was worked out, designed to cover the cost of the field inspection, and another to govern the cost of the final or shipping inspection. It is gratifying to note that the prices which were decided upon, namely, \$2.50 per acre for the field work and two cents a bushel or five cents a barrel for the shipping inspection, are nearly sufficient to carry on the work this year, and, I think, will be ample in the future, as the work can be more economically carried on as experience is gained.

As was to be expected, the acreage entered was greatly reduced this year, partly owing to the increased prices for doing the work, but more largely due to the fact that many of those who grew certified seed in 1915 sold them in the fall for spring delivery, at prices much above what could have been received at the time the sale was made, but were much below the prices paid for table stock at the time of delivery. As this part of the work has been dealt with in my report as secretary of the Seed Improvement Association, which will appear in another section of the annual report of the Commissioner of Agriculture, it will not be inserted here.

The work of the final inspection was taken up the latter part of October and, so far, only one man has been employed and this was wholly in Aroostook county where large shipments were made. It has not been, as yet, a difficult matter to handle this work in a satisfactory way. The trouble with this final inspection will come later, when the few small growers of the southern part of the state begin to ship their orders.

The amount collected, at the stipulated price of five cents per barrel sack, will more than pay for the work done in Aroostook county and will be enough, in my opinion, to make the work for the state, as a whole, self-sustaining. Here is a

question which sooner or later will have to be faced: Shall Aroostook county, with its large shipments, where the work can be done at a less cost than five cents per barrel, be compelled to pay this sum in order that the work can balance up for the state as a whole? It is very evident that the cost of the work outside of Aroostook county will considerably exceed the five cents per barrel sack. Either this will have to be made a uniform price of five cents per barrel sack all over the state, or those outside of Aroostook county will have to pay considerably more, if the work in Aroostook county is done at the actual cost there. I feel that whatever is done should be done along lines to allow the small grower an equal chance with the large grower. The idea should be to put Maine's certified seed, no matter from what section of the state it may be shipped, on the highest possible plane and, with this end in view, the benefits of agriculture of the state, as a whole, should be the guiding motive.

If the fees charged for the field and final inspection work were sufficient to make this work self-sustaining, there is still an urgent demand for an appropriation to be used in conducting this work. Inspectors have to be sent out and their expenses paid before there are collections of any amount coming in to carry on the work. In other words, we cannot collect for work promised, but must collect for work done. As a rule, the inspectors are active young men who are taking a course in the agricultural college and who intend to make plant pathology their life work. Many of these young men are working their way through college and have but little ready money to use at the beginning of the season's work and a month's expense, with team hire and travel, often amounts to considerably over \$3 per day. Unless some method is worked out, whereby the Department can have funds especially designed for this purpose, the work is apt to suffer at the very time it should be pushed most vigorously, and I recommend that the legislature be asked for a sum of \$1,000 for the year 1917 and \$1,500 for the year 1918, for field inspection work alone; and it is expected that this amount would be turned back into the State Treasury at the close of the year's work. It would seem advisable that the legislature be asked to put this work under a Bureau in

the Department of Agriculture, under the title, Bureau of Seed Improvement. At the present time the title of Assistant Dairy Instructor is misleading. When the work was first started this did not seem necessary or advisable, but the demand for certified seed from the south is becoming greater and greater each year and, unless adequate steps are taken to carry forward this work on a scale large enough to supply this demand, an immense trade which should come to our state will go elsewhere, as New York and Wisconsin are making a determined effort to capture this certified seed trade.

If the work is properly handled another year, at least 200,000 barrels of certified seed will be produced in the state and this will sell at a price around fifty cents per barrel more than the best Maine seed uncertified. Not only will this add \$100,000 of ready cash to the money circulation of the State of Maine, but it will create an increasing future demand for Maine's certified seed.

A few fields in the state have been found especially free from all trace of disease and, as far as possible, the potato growers here in the state have been urged to buy this seed for their own planting another season instead of having this especially fine stock shipped out of the state.

At all times I have instructed the field inspectors to be courteous in their manner towards everyone, and to take special pains to point out the different diseases and explain how the work is carried on in the field. Many times a few minutes' work by an inspector, who really knows his business, will give a grower ideas as to the elimination of varietal mixtures in any varieties he may have, as well as diseases—especially blackleg and stem rot.

There is another disease which is becoming a very great source of damage to the potato growers, especially those in the southern and western part of the state. This is called necrosis and is a blackening of the inside of the tubers, usually beginning at the stem end, the diseased portion of the tubers cooking black with an unpleasant taste to many people. One not accustomed to the disease would not detect it without cutting the tuber. It has been reported to me that some farmers near Portland are selling potatoes from this year's crop with

nearly 75 per cent of the tubers affected. This is causing much loss to the buyer, with potatoes practically three cents per pound wholesale, as the waste is great.

Potatoes containing net-necrosis are not fit for seed, as the resulting crop will most surely contain a much larger per cent of the tubers affected than the seed planted contained. Neither is it advisable to plant a field the second year if the previous crop showed the disease, as it seems certain that it will live over at least one season in the soil. When clean seed is used I have seen no traces of it with a four-years rotation. A special effort on the part of the Department of Agriculture should be made to induce those who have had this disease the past season to plant seed free from it.

In conclusion, I will say that I believe this work to be more firmly established than at any period since its inception; and there will be the coming season a greater demand from those growing potatoes to have their fields inspected and certified than ever before.

Respectfully submitted,

E. A. ROGERS,
Assistant Dairy Instructor.

REPORT OF STATE DAIRY INSPECTOR.

To Hon. W. T. Guptill, Commissioner of Agriculture:

I respectfully submit my report as Dairy Inspector for the year ending December 31, 1916.

As usual, a large part of the past year was spent in collecting milk and cream samples throughout the state. However, the number of samples taken has been smaller than in former years, due to the fact that considerable time was spent at other work.

Upon request from several city and town health authorities, much time was spent with them, investigating the sanitary conditions surrounding their milk supplies. Much time was also given to the investigations of complaints by individuals, charging that certain supplies of milk were under standard or that certain milk dealers were not licensed. Each of these investigations proved the milk supply in question to be above standard, but, in most cases, that certain dealers were not licensed.

The marketing of butter, cheese, etc., from wagons on the street and in public places, in our larger cities, has been thoroughly investigated during the past year. The purpose of this investigation was to determine whether or not the small wagon dealers were complying with the net weight law, requiring the net weight to be stamped conspicuously on the packages. I found considerable violation of this law in my first visits, but return visits proved that they had taken advantage of my previous warnings.

In February, a complaint came from creamery patrons at Alna, charging that they were not receiving correct butter-fat tests from the creamery. On February 21, I went to Alna with Dairy Instructor J. H. Blanchard, where I enumerated some of the factors causing variations in the butter-fat test from month to month.

INSPECTION OF DAIRIES.

The inspection of dairies throughout New England, supplying milk to the City of Boston, by inspectors authorized by the Boston Chamber of Commerce, and the retracing of this work by officials from the Massachusetts Health Department, together with a request for aid by the Portland Health Department, caused a thorough investigation of the sanitary conditions surrounding the production of milk in New England by the Chemistry Division, United States Department of Agriculture. This investigation was followed by educational lectures, accompanied by illustrative lantern slides, by J. A. Gamble, Market Milk Specialist, Dairy Division, United States Department of Agriculture.

At your request, I accompanied the inspectors of Chemistry Division, from July 27 to August 9, the time they were in Maine; and from August 9 to 12, I was with Mr. Gamble in Portland. On the evening of August 11, Mr. Gamble delivered an interesting lecture at City Hall, Portland, entitled "Clean Milk Production." His lecture was illustrated by suggestive lantern slides. The small audience present at this very instructive lecture would seem to show that all concerned in the Portland milk situation were not as deeply interested as they should have been.

FAIRS.

At the opening of the fairs, I was your representative at the following: August 22-25, Eastern Maine Fair, Bangor; September 1-2, Houlton Fair, Houlton; September 5-8, Northern Maine Fair, Presque Isle and September 12-15, Aroostook County Fair, Caribou. I was judge of Dairy Products at the Central Maine Fair, Waterville, August 28-31. I was also one of three judges of Milk and Cream at the State Dairy Conference which was held in Augusta, December 4-8.

When able to do so, I have coöperated with the Bureau of Inspection, calling cases to the attention of its Chief, A. M. G. Soule, as I have observed them.

RESULTS OF ANALYSES OF MILK AND CREAM.

Whole number of samples taken.....	369
Number of samples found above standard.....	351
found below standard	17
found below standard in butter-fat..	10
found below standard in total solids	14
found clean	205
found having visible sediment.....	163
watered	2
skimmed	2
broken in transit	1

Only fourteen samples of milk and cream which were not up to standard were collected during the entire year. Most of these cases were of slightly under standard milk, normally given by low testing cows. Both cases of under standard milk, which were proven to be skimmed, were due to the careless selling of milk from cans. Evidently the milk was not thoroughly stirred at the time of each sale, consequently the milk last sold from the can was below standard. One case of under standard cream was traced to the deep setting method of separation.

Of the total number of samples taken, only 205 were reported clean, while 163 contained visible sediment.

As there is very little watering or skimming of milk now-a-days to defraud the public, I feel that more educational work should be encouraged by this department, toward the end of cleaner milk.

REGISTRATIONS.

About 4,500 or 5,000 milk and cream dealers register as such with this department each year. The continual complaint that some one was selling milk or cream without registering, started an investigation which resulted in causing about 800 more milk and cream dealers to register. Undoubtedly there are many more dealers who should be hunted out and made to register, if they intend to continue in the business.

EDUCATIONAL.

In view of the fact that the cities are the markets to which agricultural interests necessarily have to look for the sale of their products, it seems advisable that the farmers should, essentially for the benefit of their own business comply as far as possible with the wants of city consumers and restrictions of the city health officials.

The essentials in sanitary milk production are :

Clean and healthy cows

Clean stables

Clean and healthy employees

Clean utensils

Clean surroundings of milk after being drawn

Keeping milk at low temperature

It is evident that cows should be clean. They should be free from all dirt on their flanks and quarters and should be well groomed to rid them of all loose hair.

The United States Department of Agriculture has given the following definition of milk :

Whole milk is the lacteal secretion obtained by the complete milking of one or more healthy cows, properly fed and kept, excluding that obtained within fifteen days before and five days after parturition.

It is evident, then, from this definition alone, that the cows should be free from disease and free from dirt.

Stables can easily be kept clean if the ceiling, walls and floors are tight and smooth. Hay or other dry fodder should not be fed just previous to milking. Milkers should wear clean clothing used for no other farm operation. The milker should wash his hands thoroughly and dry them before milking, and he should milk with dry hands, always.

All utensils, of course, should be kept clean. They should be thoroughly scalded or steamed just previous to use. The strainers, especially, should be kept clean. Often new pails or cans have cracks in the joints or have square corners where dirt and, consequently, filth may become lodged. Such places can be flushed with solder to do away with this. Properly constructed narrow top pails are of a great advantage. They reduce the amount of hair and dust that can fall into the milk.

Milk, having been produced carefully, and which is clean, must be kept where it is clean and, hence, must be immediately removed from the stable to the milk house. Milk easily takes up foreign odors that may be about the stable, such as turnips, ensilage, etc.

The only possible way to put clean milk on the market is to produce it cleanly. When bacteria once get into the milk it is impossible to get them out. It is the multiplication of bacteria and their toxin production that controls the souring or rotting of milk. The stable atmosphere contains, perhaps, millions of bacteria to the cubic centimeter, and when the milk is left in the barn in an open receptacle for any length of time it becomes contaminated to a very great degree.

When milk is produced in as clean a manner as possible it contains a certain kind of bacteria. Even if milk could be drawn from the cow into a sterile receptacle without being contaminated, it would contain bacteria. These bacteria are always present in milk, even before it is produced. They are lactic acid bacteria and they are the agents that cause the natural souring of milk.

It is important to exclude bacteria foreign to milk because, if they multiply rapidly and overpower the natural bacteria of milk, they cause the rotting of milk instead of the natural souring. This natural souring is, of course, very important in the manufacture of butter.

Milk, as soon as it is drawn from the cow, becomes dead matter and at once begins to deteriorate. This deterioration is caused by the natural action of lactic acid bacteria. The control of this deterioration, or the action of other bacteria, is through low temperature naturally, and through pasteurization which is rather an unnatural method.

Warm milk is a perfect media for bacteria to grow in, consequently it is important to cool milk to a low temperature while the bacterial content is yet low. The cooling should be accomplished immediately after the milk is strained, by running it over a cooler filled with ice or else by setting the cans in ice water. Milk should be cooled to at least 50° F. and 40° F. is better, if possible.

What has been said in regard to the sanitary production of milk can be accomplished by every dairy farmer at very little expense.

The point of production is the place to begin inspection, but when reasonable sanitary conditions of both equipment and methods are evidenced at the producing point, the burden of inspection then rests upon the dealer.

The value of one quart of milk is equal to:

. 3-4 lb. lean beef, at 20c.	\$.15
8 eggs, at 36c a dozen	.24
3 lbs. fresh codfish, at 12c	.36
2 lbs. chicken, at 20c	.40
1 pt. oysters, at 20c.	.20
4-5 lb. loin of pork, at 15c	.12
3-5 lb. ham, at 20c	.12

Average	\$0.22
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The prices taken in the above table for the purpose of comparison are very conservative, and are, I believe, lower than the foodstuffs mentioned can be purchased at the present time. However, as the price of milk has not gone up with the war prices and the increased cost of production of other foodstuffs, the greater is the reason that the public should buy and consume more milk as food.

CARE OF MILK IN THE HOME.

Regardless of how well milk has been cared for by the producers up to the time it is delivered to the consumer, its keeping quality depends, to a great extent, upon the care it receives in the home.

The driver of a grocery team delivers your groceries either into your hand at the door or takes them to the kitchen or refrigerator. This is evidently a safeguard against heat, flies, cats, dogs, etc. Does it not seem reasonable that milk should be delivered in the same way, as a safeguard against the unsanitary habits of the animals about the dooryard and especially against the warmth of the sun? Yes, it seems reasonable and milk should be immediately taken from the doorstep and placed where it can be kept at a low temperature.

If a refrigerator is not used, the milk bottle may be set in cold water, changing it occasionally, or it may be placed in water in an open window away from the sun.

Milk may best be kept in the bottle in which it is delivered and should be kept covered to exclude flies, dirt, etc. When milk is poured from the bottle it should be poured only into receptacles which have been thoroughly scalded. Milk poured from the original bottle and unused should not be poured back as it may have become contaminated by flies, dirt, etc., while in the kitchen or on the table. Again, milk once removed from the bottle may become much warmer than that in the original bottle and milk of different temperatures should not be mixed. Therefore, only enough milk for immediate use should be taken from the bottle.

Milk in the home, as well as in the dairy, should be held at 50° F. or lower. Held at this temperature, good milk should remain sweet for at least twelve hours after it reaches the consumer and, ordinarily, for twenty-four hours or more.

Milk from large dairies and creameries is usually pasteurized and is, therefore, reasonably safe in respect to bearing disease-producing germs. Milk delivered to the consumer directly by the producer is usually fresh and, if it has been produced by ordinary vigilance, should be a safe food. The space of time which elapses between production and consumption is a large factor which influences the bacterial content, percentage of lactic acid and hence the keeping quality of the milk. Milk shipped any great distance to dealers who have no apparatus with which to pasteurize it should be considered suspicious unless it can be pasteurized in the home. Therefore such a perishable food product as milk should be purchased from as direct a source as possible.

However, milk can be pasteurized in the home at very little expense, relieving all doubt of the safety in using it.

HOME PASTEURIZATION OF MILK.

Milk pasteurized in the home should be pasteurized in the bottles in which it is delivered. To do this it is necessary to have a small pail with a false bottom. A wire bottom can be used or an ordinary tin plate with a few holes punched in it will do. After the milk bottles have been placed in the pail, fill the pail with water nearly to the top of the bottles. Place a thermometer in one of the bottles by punching a hole in the cap



Lady Shepard DeKo'—31.62 lbs. butter in 7 days.

just large enough to receive it. Place the pail on the stove or over some other heating apparatus and heat it until the temperature of the milk is not less than 145° nor more than 150° F. As soon as this temperature is reached, remove the pail from the stove and take the thermometer from the bottle of milk and at once replace for punctured cap with a new one. If extra caps are not available an inverted cup or waterglass will do.

Place the thermometer in the water surrounding the bottles and reduce the temperature to 150° F. Cover the bottles with a heavy towel and leave them in the bath for not less than twenty, nor more than thirty, minutes. Then cool the bottles gradually by running cold water into the bath and when the temperature has been considerably reduced, cool the bottles quickly to as low a temperature as possible.

After pasteurization has been accomplished by this method the milk should be held at as low a temperature as possible until used. This process will render suspicious milk safe and will retard the souring. It should be understood, however, that milk heated to 150° F. is not entirely free from bacteria, but those causing the ordinary diseases transmitted by milk are killed at this temperature. Milk heated to a temperature above 150° F. receives a cooked and sometimes a burnt odor and taste which is undesirable.

RECOMMENDATIONS.

Inasmuch as the standards for all dairy products required by law are recognized and respected, and, inasmuch as the sanitary quality of milk and cream produced in this state is not what it should be, I recommend that more time be given to dairy inspection, at the point of production. Dairy products can be inspected as food by the Bureau of Inspection, leaving more time and money for educational work among the producers.

I wish to thank you for your aid and advice in my endeavors to make this work successful. I also wish to thank the clerical force and other members of the department who have rendered their willing services at all times.

Respectfully submitted,

CLIFFORD W. WESCOTT,

State Dairy Inspector.

REPORT OF STATE HORTICULTURIST.

To the Hon. William T. Guptill, Commissioner of Agriculture:

I submit herewith the sixth annual report of the Bureau of Horticulture.

The work for the past year has consisted chiefly of the following important lines of activity: Inspection of state nurseries, orchard and premises inspection, inspection of foreign grown nursery stock imported into the state, publication of bulletins, and office work in general. Besides this work I have judged fruit at the Somerset Central Fair at Skowhegan and the annual fair of the Sagadahoc Agricultural Association at Topsham; one Fruit Growers' Convention has been held at Bangor during the year; dissatisfactory nursery stock shipped into the state from outside nurseries has been examined when reported and statistics regarding the different lines of work have been compiled. We have received numerous inquiries asking for advice in cultivation, pruning and care of apple trees and shrubs, and when conditions have warranted, a representative of this bureau has been sent to comply with the request.

The fruit crops of both the tree and bush varieties have proved much more satisfactory than last year, but will fall considerably below the average yield. Apples have been quite apt to be inferior and diseased, especially cases where the fruit is not sprayed, which are, unfortunately, the most common. Several sections were visited by severe hailstorms, early in the season, which caused several thousands of dollars loss to the apple growers. This was the case in the eastern part of Waldo county, particularly. Apple scab has been unusually severe this season and several varieties, especially McIntosh and Northern Spy, have been practically ruined in some sections by this one disease alone. Orchardists who sprayed their fruit saved most of these varieties susceptible to this disease. The dormant spray with lime-sulphur is very effective in the control of apple scab and more orchardists are adopting it each year. With the exception of the codling moth, the most destructive insect this

year was, probably, the bud-moth. This worm has been rapidly increasing for several years and is now so common as to warrant the advisability of spraying, even though no other insects were present. The apple maggot which was so common last year has not been generally present during the past season. The reason for this has not yet been accounted for.

It is impossible at this time to give a very definite prediction as to the number of barrels of apples that will be sent to market from this season's crop, but, inasmuch as the market is much more favorable this season than was the case last year, a larger per cent of this fall's production will be marketed than in 1915. Taking everything into consideration, market conditions, scarcity of fruit, etc., the 1916 shipments should amount to at least 300,000 barrels.

The yield of bush fruits was somewhat light the past summer, due to the wet season of 1915 as well as this year's unfavorable spring, which resulted in a smaller acreage under cultivation than for several years previous. This resulted in a great demand for native grown berries of each species throughout the season. Strawberries, raspberries and gooseberries were especially in great demand.

An unusually small number of nursery shipments has come into the state during the past year, which is due to two reasons: First, a very unfavorable spring, and second, the discouraging outlook for fruit production during the past few years.

An interesting ruling of the Federal Horticultural Board should be mentioned at this time and is as follows: That fir balsam pillows, in tight permanent containers, are manufactured products, the same as an excelsior mattress, and do not require inspection.

There are five states at the present time that have made regulations prohibiting Christmas trees and greens, originating in the gypsy moth area, being delivered in their respective territories. These are New York, New Jersey, Ohio, Virginia and Wisconsin.

A new and dangerous disease, the White Pine Blister Rust, has been discovered, infecting the white pines of this state quite generally during the past year, and a great deal of attention has been attracted, especially by owners of wild lands and

farmers in general. The State of Massachusetts has already begun an active campaign to wipe out this disease in that state, and the State of Wisconsin has passed a state regulation, prohibiting any white pines from the East entering that state.

NURSERY INSPECTION.

Inspecting the growing stock in the nurseries of Maine started about the first of June, and was divided about equally between Mr. Eaton and myself. The work of inspection, as a whole, was finished about the last of July, with many interruptions from other work, such as San Jose scale inspection, orchard inspection, etc. Most of the larger nurseries were visited by Mr. Eaton and myself working together, while in the case of the smaller ones, only one man made the inspection.

The condition of the nurseries this year showed a decided improvement over last year, but as yet they are not exactly up to standard. This is due chiefly to excessive rainfall during the past few seasons, which has hindered proper cultivation and care of the plants and trees. All nurseries inspected were issued certificates upon the first inspection, with one exception. This nursery, however, was cleaned up during the summer and upon second inspection a certificate was issued.

The list of nursery men this year contains fifty-six names, which is considerable more than last year. This is due chiefly to the fact that several florists, who make a practice of selling a few plants each spring, made requests for certificates which would enable them to ship by mail or express, in accordance with the state law. The recent ruling by the Federal Horticultural Board, declaring strawberry plants as being carriers of dangerous insects and diseases, has also led us to make several inspections of strawberry plantations which have not been listed before. The list of nurseries for 1916, with date and number of each certificate, is as follows:

NURSERY FIRMS IN MAINE RECEIVING CERTIFICATES IN 1916.

NAME.	ADDRESS.	Certificate Issued.	No. of Certificate.
Bodge, Mrs. A. R.	Dexter	June 20	239
Bridges, G. B.	West Hancock	October 9	282
Casco Bay Nursery Company.	Yarmouth	June 30	246
Chapman, L. R.	New Sharon	July 7	250
Chaput, J. P.	Auburn	July 21	268
Chase, Homer N. & Company.	Oxford	August 17	280
Conant, E. E.	Buckfield	July 21	270
Conant, W. H.	Buckfield	July 21	269
Condon, Harry E.	Pittsfield	June 2	233
Craig, R. J.	Woodfords	July 21	273
Davenport, E. M.	Hebron	July 7	248
Davis, John	Surry	July 14	255
Dudley, F. H.	Auburn	July 10	252
Eastman, A. A.	Dexter	June 20	238
Eaton, S. H.	Oxford	July 14	260
Eveleth, Robert H.	New Gloucester	July 26	277
Fernald, Linwood W.	Eliot	June 30	245
Furbush, E. W.	Greene	July 7	249
Glentzel, George.	Camden	July 14	261
Goddard, L. C.	Portland	July 21	272
Hamlet, Mrs. F. M.	Old Orchard	April 25	232
Hoyt, William	Ripley	June 20	237
Hussey, J.	Oakland	June 20	236
Inman, A. E.	Silvers Mills	June 20	240
Jackson, H. A.	Gorham	July 21	275
Jordan-Blanchard Nursery Co.	Portland	July 20	266
Kirk, Edward.	Northeast Harbor	July 14	257
Lombard, T. M.	Auburn	July 21	267
McCabe, E. T.	Bangor	July 14	258
McCabe, John C.	Bangor	July 14	265
McCabe, Robert F.	Bangor	July 14	263
Macomber, E. R.	Portland	July 21	271
Mahoney, George L.	Saco	June 24	242
Maxim, H. F.	Locke's Mills	September 21	281
Merrill, Mrs. H. L.	Auburn	July 10	251
Miller, William	Bar Harbor	July 14	262
Minot Company, J. W.	South Portland	December 5	287
Mitchell Nursery Company.	Waterville	October 17	283
Morse, Fred H.	Freeport	July 21	276
Mount Desert Nurseries.	Bar Harbor	July 14	259
Palmer, C. R.	North Dexter	May 18	232
Pejepscot Paper Company.	Topsham	July 26	278
Perkins, Charles S.	East Vassalboro	June 20	235
Perley, C. A.	Winthrop	June 5	234
Phillips, W. H.	Nicolin	July 14	256
Pleasant View Farm.	Rockport	July 14	254
Plummer, H. L.	South Windham	July 21	274
Pollard, D. A.	Auburn	July 10	253
Roak Company, G. M.	Auburn	July 7	247
Saunders, Ernest	Lewiston	November 20	286
Smith, T. W. A.	Biddeford	June 24	244
Strout's Nursery Company.	Biddeford	June 24	243
Twitchell, Dr. G. M.	Monmouth	June 20	241
Wallace, A.	Portland	August 3	279
Wooster, E. W.	Washington Junction	July 14	264
York, H. Q.	New Sharon	November 2	285

INSPECTION OF IMPROVED NURSERY STOCK

A great deal of time has been spent during the past year in inspecting foreign grown nursery stock and, practically, the same number of shipments has been received as in 1915. Most of the stock comes from Holland, as has been the case in former years, and in spite of the war in Europe, our nurserymen and florists continue to buy an increasing amount of stock

from abroad. The plants, on the whole, have been found to be exceptionally free from insect infestation and diseases. One or two lots of roses were quite badly mildewed when unpacked and one lot of azaleas, in a late fall shipment, was found to be quite badly frozen. On the whole, federal stock has been very satisfactory.

The following table shows the number of plants, number of shipments and native country of different plants brought in:

Name of plant.	Number of shipments.	Number of plants.	Native country.
Araucaria	2	32	Belgium
Azalea	13	2,224	Belgium
		150	Holland
Banana tree	1	1	Costa Rica
Berry shrubs	1	100	Holland
Boxwood	2	56	Holland
Clematis	1	50	Holland
Deutzias	1	50	Holland
Hydrangea	1	150	Holland
Kalmia	1	25	Holland
Lilacs	3	41	France
		6	Holland
Ornamental deciduous shrubs and trees	3	3,600	France
		1	Holland
Phlox roots	1	12	France
Rhododendrons	3	105	Holland
Roses	9	910	England
		4,332	Holland
		150	Ireland
		225	Norway

ORCHARD AND PREMISES INSPECTION.

The work of inspection would fall into two principal divisions: First, San Jose scale infestations on fruit trees, and second, infections of Blister Rust on white pine. Due to limited amount of time, this inspection work has been carried on in connection with the nursery inspection and examination of imported stock.

San Jose Scale. The infestations of this insect have not materially increased during the last two years, and, with the exception of the southern part of York county, the greater part of the state is at the present time quite free from this most dreaded orchard pest. One important case was discovered during the early part of the summer, in a small orchard belonging to Don Sitz at Norway. This infestation was brought to the orchard a few years ago on apple tree scions which were grafted into young trees on the farm. The insects spread rapidly until the time of our inspection. Several of the trees were found to have been killed outright and others were so badly covered with the scale as to make it necessary to cut and burn them. With the kind assistance of Mr. Sitz, the most badly infested trees were cut and burned and the remainder sprayed with a strong solution of lime-sulphur. If this practice is continued and a sharp lookout kept for infestations in the neighboring orchards, this case can be kept under control.

Another small infestation of San Jose scale has been reported recently in the vicinity of Turner, but at the time of this writing, has not been located. This inspection should be continued very thoroughly in order that this insect be kept in control as well as it has been in the past.

WHITE PINE BLISTER RUST.

Several days have been spent the past season in White Pine Blister Rust inspection and both Mr. Eaton and myself have accompanied the Government Inspector, Mr. Posey, on one or more of his inspection trips, and in every case infections have been found, either on currants and gooseberries or on neighboring pines. In many cases the disease was found upon both of these hosts.

It has been known for several years that this dangerous disease was threatening the valuable timber-lands of this state and early in the summer of 1916, Mr. Posey was sent as a Government Inspector to make a tour of this state and ascertain whether the disease had been introduced here. It took only a few days' work on the part of the inspector, however, to find that our fears were well founded, for the fungus was found in both of its forms in almost the first locality inspected. This was in the southern part of York county, around Kittery and

York. The next places in which infections were found were in the vicinity of Springvale and Sanford. From here Mr. Posey worked north, keeping at a limited distance from the New Hampshire line. His results show conclusively that the disease is present to a greater or less extent in almost every pine growing area in Maine. After reaching the locality of Rangeley lakes, inspection of the interior and coast line of the state was made. The farthest north that the disease was found was in Millinocket. Due to limited time, Mr. Posey did not work farther north than this point; but, inasmuch as the disease has been found in Ontario, there is little doubt that it is present in the pine growing sections of Aroostook county and probably across the line into Canada.

Some of the towns in Maine, found to be infected, are as follows: Kittery, York, Eliot, Sanford, Springvale, Biddeford, Saco, Lovell, South Paris, Bethel, Gilead, Rumford, Byron, Rangeley, Greenville, Millinocket, Dover, Corinna, Pittsfield, Waterville, Fairfield, Bangor, Bar Harbor, Ellsworth, Rockland, Rockport, Vinalhaven, Islesboro, Augusta, Gardiner, Wiscasset, Bath, Brunswick, Lewiston, Leeds and Portland. Many other infections were found in the smaller towns and plantations, but those mentioned above give an idea as to the extent to which the disease threatens our pines with destruction.

In view of the fact that lumber owners and farmers owning more or less extensive plantations of white pine, are continually inquiring in regard to this disease, a short description of this pest is included in this report:

INTRODUCTION.

The disease affects only five leaved pine and, consequently, is found only on the white pine in this state, which is by far our most valuable pine. It does not live on the two or three leaved pine. It is found, however, in two stages, for it requires an alternate host plant upon which to pass the second stage of its life history. This is the Ribes family, or what we commonly call currants or gooseberries, both wild and cultivated. This is similar in many respects to the two-fungi wheat rust and cedar-apple rust, which also require two distinct families of plant life upon which they complete their entire life history.

In the case of the blister rust it would be: First stage, five needle pines; second stage, wild and cultivated currants and gooseberries. As no pine infected with the disease was ever known to recover, and as the disease can live on all five needle pines, which are estimated to be worth \$425,000,000 in the United States, and as, in addition, the disease once generally present, would kill young pines set to take the place of the old ones, the disease is a dangerous menace.

HISTORY.

It was in the early part of the twentieth century that it was discovered that the Blister Rust had been imported into this country quite extensively on white pine seedlings. An immense number of these seedlings came to America in 1909 and became quite widely distributed, especially in New York State. This was at the time when the enthusiasm for forest planting was at its height. Importations of pine from that time have greatly declined, until the quarantine by the Federal Horticultural Board, in 1912-13, put a stop to all importations. Thus far, nearly all of the disease on foreign stock has been traced back to one European nursery, which is one of the largest in the world, that of J. Heins Söline of Halstenbek, Germany. Up to the present year it was not known to exist in the State of Maine, although it had been found in the other New England states as well as in New York and Pennsylvania. It took the government inspector but a short time, however, to dispel all doubts in regard to the matter, as has been mentioned previously, and the problem now confronts us as to how we are going about to control the disease.

This species of pine disease has been common in Europe for a great many years on the Stone Pine, which is the European variety of White Pine. In certain sections of Europe, especially in Holland and Germany, the disease has caused much havoc in nurseries where it attacks the young, tender pines very seriously. In some places, notably, in Holland, at Oldenburg, Germany, and at Moscow, Russia, the disease is so serious that the cultivation of white pine has been altogether abandoned. Young trees are killed outright by the disease and the small branches of large trees are killed.

APPEARANCE.

The most characteristic symptom of the disease on the pines is the irregular swellings of the bark. A healthy pine usually has practically uniform diameter throughout the length of each year's growth. These swellings usually develop at the base of the tree, or just at the lower branches, if it is a small tree. If it is a large tree that is diseased, the smaller branches are apt to show similar irregular swellings. Trees four or five years of age are usually stunted in their growth and have an abnormal and compact appearance. Diseased trunks, limbs and twigs affected with the fungus, finally die from its girdling effect and are very noticeable on inspection, as they remain upright instead of drooping, as is the case with twigs affected with frost or insects. The work of this disease is often confused with that of the White Pine Weevil, which is becoming numerous on our younger pines. This weevil, usually, kills only the top central shoot, while the Blister Rust nearly always kills side branches, or the upper part of the entire top.

It is during May and June that the fruiting bodies appear on the trees and it is at this time that the disease is usually easiest to determine. At first, these fruiting bodies appear in the form of whitish blisters which are usually longer than wide, and about the size of a small kernel of corn. These are found at irregular intervals in the swollen portion of the bark. After a few days the outer membrane, which is white in color, breaks open and the top falls off, leaving dusty, bright yellow spores exposed. These are blown out of their cup-like cavities to neighboring currants and gooseberries.

On currants and gooseberries the parasite attacks only the under sides of the leaves. It has two distinct forms here. One of these forms is known as the repeating stage, which is usually throughout the summer season. Spores are formed that spread to infect other currants and gooseberries, sometimes traveling as far as four or five hundred yards and possibly even farther. The other stage of the disease, on the currants and gooseberries, is in the fall when a different form of spores appears on some part of the leaves, where the repeating stage is produced. These spores cannot spread the disease to other currants and gooseberries, but only germinate upon neighboring pines. The spore produced by the disease upon the pines cannot produce

it upon other pines, but only on currants and gooseberries, while the first set of spores on currants cannot start the disease on pines. It is only the fall formed spores that are able to infect the pines.

TREATMENT.

The method of treatment thus far practiced by other states in controlling this disease has been to destroy all pines known to be infected and to keep all currants and gooseberries in infected localities destroyed, so that the disease cannot be spread by them to other sections.

It is not known at the present time just how generally the Blister Rust is present in the pine forests of Maine, but measures should certainly be taken at once to ascertain. Probably the best method for state officials to adopt, providing that the proper provisions are made by the legislature, would be to check the disease in the worst affected localities by the treatment mentioned above. National authorities are willing to coöperate with the state officials in any campaign in blotting out the White Pine Blister Rust while it is possible.

BANGOR FRUIT MEETING.

The Annual Fruit Growers' Convention was held March 24, in connection with the Potato Growers' Meeting at City Hall, Bangor, under the direction of the Department of Agriculture and the Bangor Chamber of Commerce. Reduced rates were given on all railroads and able speakers were procured. Two of these were W. H. Woodworth of Berwick, Nova Scotia and H. A. Emerson of the New York State Department of Foods and Markets. Mr. Emerson's lecture was on the subject of Markets and his interesting talk, printed below, should be read by everyone interested in the marketing of any form of produce. Mr. Woodworth gave a most interesting demonstration and talk on Packing and Grading of Apples, and many questions were asked him by the audience. He is by no means a stranger to Maine apple growers and has won many friends in the several times he has spoken at fruit conventions in this state. It might be interesting to add here that Mr. Woodworth was employed by the

State of Massachusetts, during the apple harvesting season in 1915, to go about the apple sections, instructing the farmers as to the proper methods of packing and grading their fruit in accordance with the state apple law.

The other speakers for this meeting were from within the state and their subjects were ably treated and were very interesting and instructive.

Only two of the lectures are printed here, as no stenographic reports were taken. A copy of the program follows:

FRIDAY, MARCH 24, 9 A. M.

Coöperative Marketing, E. E. Conant, Buckfield
Manager Maine State Fruit Growers' Exchange

Discussion

Birds of the Orchard, William E. Powers, Machias

Discussion

Packing and Grading of Fruit,
W. H. Woodworth, Berwick, N. S.

Discussion

2 P. M.

Spraying, Dr. G. M. Twitchell, Auburn

Discussion

Transportation, R. L. Cummings, West Paris

Discussion

Pruning, G. A. Yeaton, Norway

Discussion

7 P. M.

Markets, H. A. Emerson, New York City

Department of Foods and Markets

MARKETS.

H. A. EMERSON of New York City, Department of Foods and Markets.

It is a pleasure for me to be in this beautiful Maine city, and to confer and discuss with you the problems of marketing the great apple crop which this state annually turns out.

Representing, as I do at this time, the Honorable John J. Dillon, Commissioner of the New York State Department of Foods and Markets, and six million consumers in the city of New York, and about four million other consumers in the smaller cities of our state, as well as the cities closely adjacent to New York city, which are supplied through the New York city market, I can assure you that our interest in your welfare is very great.

Experts, who have carefully figured out this constantly increasing consumption, tell us that, with the present rapid growth of our cities, we will need in New York City twenty years from now, for distribution in the city proper and its suburbs, fully double the amount of food stuffs that we now require.

The consumers of our great city, we estimate, paid \$1,200,000,000 for foodstuffs in 1915 in the City of New York proper.

In 1910, there was such an extraordinary amount of complaint regarding the high cost of living, among the consumers residing in our great cities in the State of New York, that the legislature, through Governor Dix, caused to be appointed a committee to investigate into the high cost of living, the causes for the same, and the economics that might be put into operation to lessen this cost, if any could be found.

After many months of investigation they reported to the Governor and the legislature that they had found the present method of receiving, marketing and distributing foodstuffs in New York City was very crude, expensive and out of date.

They made a conservative estimate and reported that, in their judgment, the waste between the time that the foodstuffs arrived on the docks in New York City and the time that they reached the consumer in New York City represented more than \$120,000,000, annually.

Ezra A. Tuttle, a Long Island farmer who, for many years, was a corporation lawyer in New York City, connected with the street railway people, made a minority report in which he stated that in his judgment the waste between the time the goods arrived on the docks in New York City and the time they reached the consumer was not less than \$200,000,000, annually. Even if the estimate of Mr. Tuttle was high in 1910, the great increase in our population and the increase of the amount of foodstuffs arriving in New York since 1910 makes it almost certain that the waste at the present time is not less than \$200,000,000, annually.

The New York State legislature took the matter under advisement and, after careful consideration, passed an act establishing the New York State Department of Foods and Markets and, under that act, Governor Glynn appointed the Honorable John J. Dillon, Commissioner of the Department.

Commissioner Dillon, seeing the small amount of money that had been appropriated would do but little, went to work heroically to do the best he could with the amount of funds appropriated, only \$15,000 to carry on the work for the entire year, where at least \$200,000 should have been appropriated to the department.

The department had only been installed in office about forty-five days when the Bread Trust of New York City decided that they would raise the price of bread from five cents a loaf to six cents per loaf and that they would cut down the weight of the loaf three ounces. Commissioner Dillon made a complaint to the attorney general's office and an investigation was started, the daily newspapers coöperating.

As the facts were rapidly developed, the only reason for the advance of the bread was to make money for the bread trust, the people who were conducting these large commercial bakeries sued for peace. They told the investigators that if they would stop their investigating, they would put the price of bread back to five cents a loaf and would put sixteen ounces

into each and every pound loaf of bread. As that was all the department wanted, the investigation ceased.

The result has been very satisfactory to the consumers of bread in New York City. Two million loaves of bread, commercially baked, are consumed in New York City each and every day in the year and this saving of one cent per loaf meant a saving to the consumers of New York City, through the activities of the New York State Department of Foods and Markets, of \$20,000 per day.

The department's next great work was in opening up the apple market of New York City so that the producers of apples throughout the state might have the same facilities for marketing their apples as was granted to California, Florida, Porto Rico and Buenos Ayres for the marketing of their fruits. The department having no money, made a contract with the Fruit Auction Company, a large and wealthy corporation selling fruits at auction in New York City, and on the railroad docks in that city, to sell the New York State products and the products from other states which might be shipped to the department.

The arrangement was made with the Fruit Auction Company that they would do the selling and cash the sales on the day following the sales, assuming all responsibilities and liability regarding credits; that they would do this work for three per cent and the state would charge five per cent for doing the work, so that the two per cent would go to the support of the New York State Department of Foods and Markets.

To begin with, great combination sales of apples still hanging on the trees in the orchards of the New York State growers were organized. They were widely advertised in every state in the union and abroad. Previous to the time of advertising these great sales, the old line apple trust members had been quietly bidding the farmers, at least in New York State, from 90c. to \$1.25 per barrel; but after the sales were advertised, the trust buyers raised their bids in some instances to \$2.25 per barrel. When the first great auction sale was held at the farm of William Teator at Red Hook, N. Y., as high as \$3.25 was paid for apples in the open.

On the following day, at the farm of Mr. Deyo at Gardiner, N. Y., nearly 30,000 barrels of apples were sold at an average

price of \$3.15 per barrel for A and B grade Baldwins, Greenings, Spies and McIntosh varieties.

Ten days later the New York State Department of Foods and Markets sold in the courthouse at Syracuse, the apples in the orchards of Onondaga county, and for the great sod cultured orchards of Grant C. Hitchings and Mr. Knapp they obtained \$3.40 per barrel for A and B grade. This price showed what an extreme advantage the trust apple buyers were taking of the producers of apples in New York State. The prices obtained by the Department at auction were wired all over the United States and it standardized the price for barrel packed apples throughout the United States.

The department then began selling apples in New York City daily, and whenever they have had the supply they have conducted the sale of apples at auction in New York City each and every day in the week, except Saturday and Sunday. As a result, every grower of apples throughout the United States has had an opportunity to ship his apples to the New York State Department of Foods and Markets and have them sold in an open market at public auction, at five per cent commission, to the highest bidder.

The railroad companies coöperated with the department and turned over the use of their great docks without any expense, whatever, properly equipped for auction selling. Right alongside these docks come the car floats with the loaded cars on them and the fruits and vegetables are discharged direct from the cars upon the dock, samples opened up, catalogues printed, buyers inspect the goods and then they bid for the goods what they consider them worth, and the goods are sent direct from the dock to the retail food stores throughout the great city, saving an enormous amount of money each year in cartage and unnecessary handling, eliminating at least one and oftentimes three sets of middlemen who formerly handled these goods and collect their tolls for handling.

Under the old system of shipping to a commission man, the grower of apples in New York State paid ten per cent to the commission man who sold to the jobber, and the jobber was obliged to take about fifteen per cent in order to pay his expenses and then there were two cartages so that it cost the grower, at the very lowest, thirty per cent to have his apples

sold and sent to the retail distributors. Now, under the state supervision, the same work is done for five per cent, which shows a saving to the growers of New York State and of adjoining states, who patronize the New York State Department of Foods and Markets, of twenty-five per cent in the handling of their products.

In the auction system there is absolutely no chance of fraud or deception—no opportunity for crooked work of any kind or description. Every sale is sworn to and the buyer's name given, when requested. The state has its inspector on the auction block, watching the sale alongside of the auctioneer, and the results have been extremely satisfactory to the shipper. Then immediately the New York State Department of Foods and Markets calls in the representatives of the Press of the great city, tells them the price that the goods are selling at which they should sell at retail, and, as a result, we find consumers have bought apples for the past six months in New York City at thirty-five cents less than they bought apples during the same six months one year previous, when there was no New York State Department of Foods and Markets.

We find that, on the four million barrels of apples packed in New York State in 1915, the producers received at least \$1 per barrel more than they received the year previous, when there were one million barrels of apples less produced than there were in 1915.

It is easy to see that the law of supply and demand does not work very well if there is a trust in the business handling the product, which is extremely greedy and anxious to make all the money possible for its stockholders.

In our great city everyone approves of the city taking charge of supplying its inhabitants with the best and purest water possible, at the lowest possible cost, and the city has made a great success of supplying its inhabitants with water; but in the matter of foodstuffs, the city has let old, antediluvian methods operate up to the present time. The auction system under state supervision represents the twentieth century method of marketing foodstuffs. It represents, in the handling of foodstuffs, economy, efficiency and honesty.

Think of the economy of having one of the transportation companies turn over the dock, the rent, which would cost

you \$300,000 per year and they turn it over to the state for nothing.

And then, in addition to this you have an absolute certainty that if you standardize your goods, grade them carefully at home, put them up in the best kind of package, the buyers bidding for these goods will pay a premium that will justify you in doing your work right in grading and packing the goods where they are raised.

Competition has always been considered a necessary element to satisfactorily market any commodity. In the auction system at our sales, you have from two hundred to three hundred retailers and their representatives bidding for the goods, with but one salesman. Under the old commission system, you have forty-five or fifty men running around trying to sell the same commodity to the same buyers. It was an easy matter for a buyer to tell the salesman that some one else had offered him the goods for less; that he could buy them cheaper. In the auction salesroom there is no opportunity to do this. There is but one way you can secure the goods and that is to bid up a price over and above what the other fellow bids for it.

Chicago has become the greatest grain market in the world and it has been the greatest grain market for many, many years. In that market the State of Illinois has for years maintained the inspection bureau which inspects all the grains that arrive in Chicago and puts the grade on them. In New York State the commission merchant or wholesale merchant has been his own inspector, and if the market was not right, he sometimes did his own rejecting. If the market was down, the goods were poor very often; if the market was up, the goods were very satisfactory. If the goods were on commission, he labored with the publishers of the prices current to have the quotation low, and as the price current man had no other method of finding out what the market was, except to listen to what the sellers told him the price at which they had sold the goods, he published whatever he was told. It was only human for the receiver of the goods to be conservative in giving out prices. He was very careful not to give out a price higher than he had actually sold the goods, and very often he had not sold the goods at all, but had simply given them to somebody, and was to bill them at the market quotation. This has lead to a

condition where the market quotations are very seldom correct. They are made entirely in the interest of the middleman handling foodstuffs. When the goods are sold at auction, the price quoted is the actual price at which the goods are sold.

The consumer is not complaining very bitterly; wages are good in the cities, everybody is employed, prosperity seems to be rampant throughout the nation; never before was the United States accumulating money so rapidly as it is at present and, while you are sailing kind of easy in a good boat, it is a pretty good time to prepare for a storm. Preparedness is in the atmosphere everywhere. The Government is taking it, advocating it, advising it, the people everywhere are thinking of it and arranging for it, and it is time that apple growers were preparing for a season when crops will be large, and it will be necessary to economize in every way in the marketing of same.

Get together in your great coöperative societies here in this state as did the milk producers in the central western country years ago in the manufacture and marketing of their cheese and butter. Standardize your goods, package them in the very best and most approved manner, grade them as buyers want them and then ship them to the New York State Department of Foods and Markets, in such quantity as you wish to market in New York City. Deliver a quality to the State Department that is sure of bringing a good price and, based on the price for which your apples sell in New York City, you will market the remainder of your crop in other markets at very satisfactory prices.

Great packing concerns at Chicago have set you a great example. It is one well worth imitating. They have put their products up in the most tasty, neat and sanitary manner imaginable. They have arranged for the widest distribution possible. They have avoided glutted markets and they have made enormous profits for the stockholders of their company. What Armour and Swift did in the meat business in Chicago in a large way, you can do equally well in the marketing of Maine products which you produce, and it will be in a large way. Never let such cities as Mobile, Jacksonville, Charleston, New Orleans, Dallas, Galveston, Havana and Buenos Ayres be without your potatoes when there is a market there for them.

Take into consideration that they cannot hold their potatoes for future market as we can in the North, but that they must send them to market immediately when they are packed. You have a great advantage in the marketing of your crops over the growers in the South. Take advantage of your opportunity. Have established daily in New York City on high quality Maine apples and potatoes, a proper market price, and then make your other sales based on the prices established at the auction; see to it that in the daily papers of New York City there is a constant advertisement to consumers to use apples and potatoes produced in the State of Maine. Tell of their virtues and their good qualities and see that they have nothing but virtues and good qualities to boast of or to tell about. Apples and potatoes can reach the consumer in New York City after they have struck the dock, at an advanced price of not over twenty per cent, if producers will do their duty. Centralize the business and take advantage of the great opportunity that New York has furnished in marketing at auction through its Department of Foods and Markets.

The New York State Department of Foods and Markets is asking the state to appropriate \$350,000 for its support the coming year. It intends to build a great milk and cream distributing plant, manufacture sweet and salt butter, ice cream and other by-products.

Maine will be able to ship large quantities of cream to this station and the prices of milk and cream for Boston and other cities will be established, based on the price paid at auction in New York City.

You want to know what all this means to the State of Maine, this proper marketing of your products? In my judgment, it means that Maine will see as great prosperity as the central western country, which produces grain, is now experiencing. It is my opinion that every foot of your tillable land will be cultivated profitably; that you can double the amount of food-stuffs which you have been producing in the past, and that you will receive, with an honest, open market in New York City under the state supervision, at least 25% to 30% more for your apples and potatoes and other surplus food products than you have ever been receiving in the past.

When you receive this additional 25% or 30% for your food products, the consumer will not be paying any more than he has been paying and, in my judgment, he will be paying 25% to 30% less.

Under the present system of delivering milk in New York City, very often nine wagons come to each block in the city every morning in the year, where one wagon could do the work under proper management.

Canada has taken hold of the matter of marketing its foodstuffs and keeping the producers advised of honest markets, and not manipulated markets.

The New York market, with its commission men, its jobbers, its market manipulators, its false and fictitious quotations, is as far behind the times as an ox-cart would be for pleasure riding; and compared with the auction system, it is as far behind the times as the using of the cradle for cutting grain.

If proper support is given to the New York State Department of Foods and Markets, and this business is permitted to grow and develop, your products will bring so much more money that in five years your farm lands will double in value. your boys and girls will want to remain home on the farm and not go to the city to become the hirelings of some rich corporation.

You can produce as good potatoes as any state in the Union and your land for potato raising should be as high as any land on which potatoes are grown in the United States. You can raise as fine apples as any state in the Union and your land for orchard purposes should be worth as much as the land out in Oregon, Washington and the far west.

Remember, the freight on apples from Oregon and Washington is fifty cents per bushel, and the icing charge ten cents per bushel. You can box your handsome Northern Spys, Baldwins, Greenings and Spitzenbergs, and with their better flavor you can out-sell any far western apples.

Billy Sunday, the evangelist, bought an orchard at Hood River, Oregon, for which he paid \$80,000. As I remember, there were only fifty acres in the orchard. He cannot raise as fine flavored apples as you can raise here in Maine.

The evangelist comes back to this eastern country to preach and to pray and to get the money for his orchard. He is doing

a grand work, but we are asleep at the switch in this eastern country when we let him spend his money for apple lands in the far west. You folks here in Maine or the people over in New York State or some other eastern state should have sold him an orchard.

When you stop to realize that the New York State Department of Foods and Markets has cash and credit with the Fruit Auction Company, amounting to \$2,500,000 and that they sell direct to the retail distributors who run the retail stores, and that they advertise in the daily papers the wholesale price and what the retail price should be, then you realize what an opportunity you have, for the first time in your lives, to satisfactorily market Maine products.

With the cities growing so rapidly you should increase your products and adopt twentieth century methods of marketing. Let honesty, economy and efficiency be your watchwords as well as ours.

Remember that it costs the great beef packers of Chicago but $3\frac{1}{2}\%$ to sell and distribute their meats to the retail butchers of New York City, and remember that it has cost the producers of Maine, to do the same work under the old commission system of marketing and dealing through speculators and market manipulators, not less than 30% to 40%.

The Southern California Fruit Exchange is spending \$300,000 annually to advertise its sunkist oranges. Put your Maine apples and Maine potatoes in the right kind of packages, send them to the Department in New York City, and we will do your advertising for you at the expense of the state, in the interest of our consumers. This is the time for the State of Maine, through its Agricultural Department, its producers and coöperative societies, to coöperate with the New York State Department of Foods and Markets in New York City, the greatest market for foodstuffs in all the world.

BIRDS OF THE ORCHARD.

WILLIAM E. POWERS, Machias.

So widespread is the fear of insect devastation, and so universal is the belief in the interdependence of the kindred sciences, entomology, ornithology and botany, that the Biological Survey of the Department of Agriculture at Washington is coöperating with state governments in endeavoring to maintain a balance between the vegetable and animal kingdoms.

As a result of all this study, every effort is now being made to protect, encourage and foster the native bird population of the land. Scientists are studying the life histories of plants and animals and nature clubs are collecting facts of great value, while the societies of national scope are scattering broadcast the results of intensive study along particular lines. The utility of birds in suppressing outbreaks of injurious insects by massing in enormous numbers at the point of attack is beginning to be understood, and the wanton destruction of the species beneficial to man is now restricted in every state.

It is my purpose to recall something of the destruction caused by a few of the insects most injurious to the fruit industry and then show the great work done by birds in keeping these insects in check.

San Jose scale, bark lice, aphids, currant worms, grape vine moths, chinch bugs! Where shall I begin? "The annual loss in the United States from the chinch bug alone," says Dr. Howard, "cannot be less than \$20,000,000," and the total value of farm products ruined yearly by injurious insects is estimated at from \$800,000,000 to \$1,000,000,000, without reckoning the vast amounts expended for insecticides and the labor of applying them.

The codling moth or apple worm, perhaps the most destructive insect in this country today, may serve us for a beginner. This pest was early imported from Europe and is now at home wherever apples are grown in this country or Canada. It

causes an annual loss of from 25% to 75% of the apple crop, as well as many other fruits.

The codling moth passes the third stage of its existence in the crevices of the bark upon the trunk of the tree. Now nature has fitted a whole series of birds for a tree-trunk life, and they cannot acquire their subsistence anywhere else. Such birds are the woodpeckers, nuthatchers and tree creepers, while other birds like the sparrows, bluebirds and chickadees glean from the trunks.

The downy woodpecker, the avowed enemy of the codling moth, is with us all the year round. His whole life is given to the destruction of insects that do injury to the trees. Whenever and wherever you see him, you will find him searching for food in and under the bark. In a twenty-five year study of birds I never saw one on the ground or on the tops of the branches. His whole anatomy is adapted to the life he leads, toes four, two in front and two behind, long, strong and flexible, and each armed with a strong curved claw; legs strong, and a tail fitted as a prop to serve as a fulcrum to give added strength to his blows; tongue, the most wonderful of nature's work in its adaptability to its uses, capable of being extended almost indefinitely, its point armed with a barbed spear-like tip for probing and bringing forth from the bottom of the opening cut by his chisel bill any larva disclosed therein.

Search your orchards for samples of his work. Examine the bark scales he has pecked into. Remove them and find the empty cocoon beneath. If you find scales with living pupæ under them, you have not woodpeckers enough to take care of your trees. Carry home with you some of these bark scales that have been treated by the downy. Next May or June, collect an equal number of adult moths and kill with cyanide or chloroform. Next summer lay beside the empty cocoons and dead moths an equal number of wormy apples, cut open so as to show the ravages of the insect in its larval stage; if possible, put with them an equal number of small green apples, each one with a flat, oval, scale-like egg upon it, and learn a lesson that will make you and your posterity the everlasting friends of the downy woodpecker. If you are not yet convinced of the utility of the downy, solve this simple problem in arithmetic: If a codling moth lays 80 eggs (the average

number is 85) on 80 apples, and half of these eggs develop females, and each of these lays 80 eggs, how many dollars' worth of apples, at fifty cents per bushel, reckoning 150 apples in a bushel, will one codling moth and her progeny destroy in one season? When you have found the answer to be \$5.50, just consider how much each downy woodpecker is saving for you, provided he eats only one larva per day for only one month.

Were the codling moth the only injurious insect destroyed by this bird, we should owe him a debt of gratitude for this work alone, but there are other hidden enemies tunnelling in the wood itself, such as the round-headed apple borers, wood-boring ants, wood-eating beetles, the birch borer, the maple borer, and the pine weevil. All of these insects work serious damage to our forest growths, and, if not held in check by their natural enemy, would soon become a serious proposition to owners of wild lands.

Everyone who raises fruit for home consumption, or for market, feels himself almost helpless when signs of the borers appear in his trees. Their method of work is so insidious that only the trained eye can detect evidence of their ravages before the trees are ruined. The downy woodpecker is always on the lookout for these borers. Expert at auscultation and percussion, he explores suspicious localities and quickly detects evidences of secret chambers within. Cheerful and industrious, he gives utterances to his labor song, *pick pick*, and suits his actions to his words by picking out the boring larva within.

During the summer months, other tree-trunk inhabiting birds come up from the South to aid the downy woodpecker in his work. Chief among these in his importance to the fruit grower is the black-and-white creeping warbler. This is a common bird in the orchards and woodland, and may be called fairly abundant in the groves and smaller clumps of trees around New England villages. He is the particular favorite of the young naturalist, being generally the first of the warbler family to be carefully studied. Like the woodpecker, he is fitted for a life upon trunk and branch, but the tail is not used in climbing and his bill is too slender for cutting. He may be seen during the summer season creeping about over the tree trunks, often hanging, head downward, searching diligently here and

there, over and back, for insect food. Like the woodpecker, he sings at this work and his song is the embodiment of his life's purpose, being a monotonous but not unmusical *I see, I see, I see*. And he does see every bark louse, canker worm, bark beetle, curculio, click beetle, caterpillar, resting moth and hidden egg. He reaches for the larvæ that are spinning down from the branches, darts like a flycatcher for flying insects that have been startled from their hiding places by his approach, and when the trunk has been cleared, he often descends to the ground for cutworms. Hairy caterpillars are a favorite morsel, and he really enjoys eating the dreaded gypsy and browntail larvæ.

It may be well to digress for a moment to note the enormous amount of food required daily by nestling birds and the constant care and tedious labor imposed upon the parents to procure it. It is a fact established by observation and experiment that growing birds will consume a daily ration of meat equal to their own weight. The stomach must be kept full of food during the day to insure the fledgings' health and comfort.

A young robin that fell from the nest was brought up by hand and fed on angleworms. The man who reared him found him always hungry, and to satisfy his curiosity, resolved to fill up that robin at once. The bird ate that day fourteen measured feet of fat, juicy, wriggling worms, and the next day was as hungry as ever. Charles Nash, author of "Birds of Quebec and Ontario," fed 165 cutworms weighing together five and one-half ounces, to a young robin weighing only three ounces. A man weighing 150 pounds and eating at this rate would require 275 pounds of beefsteak daily.

Birds are in some respects the most highly specialized of the animal kingdom. Their temperature is higher and their respiration more rapid than in man. The young of many birds under favorable conditions develop as rapidly as the insects on which they feed. Two different broods of song sparrows were out of the nests in eight days. In this incredible short space of time they had developed from naked, blind, and helpless nestlings to full feathered, wide awake and active investigators of the insect conditions in their immediate neighborhoods. Before they left the nests, each bird was requiring one hundred caterpillars daily, and as the broods each numbered five, one thou-

sand caterpillars was the daily ration eaten by the young birds, besides what the four adults consumed. Consider for a moment the work done in one month by these birds; and when the second and third broods appeared, 90,000 caterpillars were deprived of ability to injure fruit trees during every period of thirty days.

Our common yellow warbler is another bird which comes in numbers from the South and makes its home in our orchards and village streets. Almost entirely insectivorous, it feeds on the greatest pests that attack our orchards and small fruits. Caterpillars form two-thirds of its food, and while it is not primarily adapted to a tree-trunk life exclusively, it is always on the alert for small bark beetles, boring beetles and plant lice. Like the woodpecker and black-and-white creeper he sings at this work, and as he eats the young larvæ of the gypsy and brown-tail, its song, *sweet-sweet-sweet-sweetity-sweet* would not seem inappropriate.

The American redstart is another trunk loving gleaner whose fly-catching proclivities are so well developed that nothing escapes it. It delights in hairy caterpillars, moths and beetles that would otherwise live to defoliate our orchards and destroy our fruit. It forages from ground to tree-top, holding its wings in readiness for instant attack upon every moving insect. It is one of our most beautiful and trusting birds and has a sweet and varied song. Chapman says that in Cuba, where most of our warblers winter, they are known as "butterflies," but the redstart's flaming plumage has won for it the name of "candelita," the "little torch."

The black-throated green warbler is another frequenter of the trunks of trees, though most of its work is confined to the area covered by the branches. Its food consists of a variety of small insects, including several injurious caterpillars, curculios, beetles and bugs. The stomachs of five birds taken in Nebraska contained 220 insects, an average of 44 to each bird. Seventy per cent of the food of one Illinois specimen consisted of canker worms. Like the black-and-white creeper, the black-throated green warbler is a species dear to the heart of the young naturalist, and its characteristic song is early learned. Bradford Torrey translates it as "Trees, trees, murmuring trees," but to me it seems to say, "Cheese, cheese, a little more

cheese." I have never heard any wild bird sing an articulate word, and probably no two people hearing the same bird for the first time would write its song with the same words. But if suitable words can be found to interpret birds' notes, it is wonderful how it enables the listener to distinguish different species in a multitude of songs.

One of our best known bird songs is that of the white-throated sparrow, yet every author writes it differently. I was tempted to say one of our best known birds, but a long experience as a teacher of nature studies has convinced me that while nearly every one knows the song of the white-throat, very few persons really know the bird. The "Indian name," says William J. Long, "is Killoleet," and a more appropriate name could not be found. The song is clear and very musical. Any one who plays can easily reproduce it on the piano. Various interpretations are *Old-Sam-Peabody-Peabody-Peabody*, *All-day long whittling-whittling-whittling*, *My-own-dear-Canada-Canada-Canada*, and *O-hear-killoleet-killoleet-killoleet*.

And what claim does this songster have upon growers of fruits, and why should he be protected and encouraged? If a bird that devours tent caterpillars, plant lice, tussock moths, and destructive beetles found on the trunks of our apple trees, does not deserve a place in our hearts as a protector of fruits, the fact that he also, on occasions descends to the earth and searches for ground beetles, may throw the balance in his favor.

The chipping sparrow, the companion of childhood, is a constant worker in the garden, yard and orchard. It is sometimes called the hair bird, from the long horse hairs used for lining its nest, which is placed in a tree or vines near the house, that no time may be wasted in reaching its feeding ground. Next to the robin, it is the most familiar of all our birds and often picks up crumbs near our doors. Its song is a mere string of *chip-chip-chips*, with no more music in it than there is in the monotonous click-click of a sewing machine. Its spring and early summer food consists of caterpillars. So persistent is this bird in its search for caterpillars that it interfered seriously with experiments that were being made upon gypsy moths under cover, by breaking through the net that enclosed them, and eating the larvæ. Such persistence should be en-

couraged. The chippy is no epicure in the matter of insect diet and devours the brown-tail, tent caterpillars, tussocks, codling moth, forest tent caterpillars, leaf-eating beetles, cabbage worms, beet leaf grubs, and other beetles of various kinds. Mr. Kirkland saw it eat fifty-four canker worms for one meal.

Another one of our birds that is valuable to the fruit grower is the Maryland yellow throat. It is an easy bird to study, for three reasons: First, it has a distinctive habitat; second, it has a distinctive song; and third, it has a distinctive coloration. Its throat is yellow; there is a black stripe across its forehead, eyes and cheeks; its back is olive green. Its song is very characteristic. It is written: *Whittity-whittity-whittity-whit*, and *witchery-witchery-witchery-witch*.

I was lecturing on birds at the Newcastle Summer school, when a woman asked: "What bird is it that says, '*Great Caesar-great Caesar-great Caesar*?' I said, "I do not know, but if you will come out tomorrow morning with my bird class at five o'clock, I will tell you what it is, if we can find it." She lived five miles from the village, but at five o'clock the next morning she was on hand. My class had been studying the Maryland yellow throat for a week and every one in that class of forty-five had learned its song. We started on our walk, when all at once this woman exclaimed, "Oh, there's the great Caesar bird." And there was our old friend, the Maryland yellow throat. I told this story at a teachers' meeting in Augusta the next winter. After the meeting a young lady came to me and said, "I have another story about your 'great Ceasar' bird. I went from that summer school down to the beach and the cook at the cottage where I stayed said, 'Do you know anything about birds?' I said, 'Yes, I know anything.' 'Then please tell me what bird it is that, every morning when I begin work, comes to the kitchen door and sings, *Gingerbread-gingerbread-gingerbread*?' " The yellow throat is a bird of the roadside and shrubbery, wherever water is found, but it is a constant visitor to the orchard for caterpillars of all kinds.

The yellow-billed cuckoo should be better known for it eats tent caterpillars from morning till night. Of 155 stomachs examined between May and October, only one contained fruit. In a five-years study of the bird conditions in the State of

Maine, covering various portions from north to south, stopping two weeks in a place and teaching in a summer school, I never went out one morning with a class without finding the yellow-billed cuckoo. It destroys thousands upon thousands of tent caterpillars that would otherwise live to damage the fruit crop. While some of our birds devour every smooth caterpillar they find, they have no taste for the hairy varieties, but the cuckoo prefers them. It eats tent caterpillars until its alimentary tract from throat to vent is lined with caterpillar hairs. Cut one of these birds open and it looks as though it was lined with fur.

After our summer birds have gleaned all summer long from the trunks of our trees, they leave us, and it does not seem as if anything could be left of eggs and insects under the bark to support the army of insect eating birds that comes down to spend the winter with us. The chickadee nests here in small numbers, but during the winter months it comes down from the north in abundance. Think of the amount of food that is required to support the life of these warm-blooded, active and cheery companions of our winter walks. Last winter the thermometer ran as low as 50° below zero, yet these hardy birds bent cheerfully to their task of saving these very apples we have seen at this meeting. Even in the terrible cold they sang at their work, *chick-a-dee-dee-dee*.

The white breasted nuthatch is another bird that nests here rarely, but as soon as cold weather comes on, his numbers increase and he begins his search up and down the trunks. His song is *yank-yank-yank-yank*, and he, too, must search diligently for insect food that escaped the sharp eyes and ready bills of our summer residents.

Another winter bird is the brown creeper. Like the woodpeckers, his tail feathers are fitted for support in climbing. His bill is long and slender and curved to facilitate investigations into insect conditions under bark scales. From early morn till dark he must search for insect food. His particular sphere of action, like the woodpecker's, is the tree trunk. His body is so small that it seems impossible for him to maintain an existence in the terrible cold. Starting at the bottom of the tree—he never crawls down—he begins and circles around the trunk, hunting, hunting; as soon as he gets to the branches,

down he goes to the bottom of another tree. I have watched him half a day at a time, watched him work with that little narrow curved bill in the crevices of the bark, searching, searching, searching.

Does it seem as though there could be any insects left to develop next summer? Unfortunately there are. What is the reason? These birds were intended by nature to hold them in check, but we have foolishly destroyed the birds. Do you want your fruit trees better protected? Then stop the slaughter of birds about your orchards. Go home and kill your cat. Stop your boys from robbing nests. Study the part that birds and insects play in fruit culture, and bountiful harvests will follow.

NURSERIES.

List of Nursery Companies that have delivered orders in the State of Maine during the year 1916:

	NAME.	ADDRESS.	No. OF SHIPMENTS.	
			Spring.	Fall.
1	Allen Brothers.....	Bloomington, Mich.....	1	-
2	Allen Nursery Company.....	Rochester, N. Y.....	5	-
3	Allen, W. F.....	Salisbury, Md.....	2	-
4	American Forestry Company.....	Framingham, Mass.....	1	-
5	Bacon, W. & A.....	Boston, Mass.....	1	-
6	Baker's Nursery, Bert.....	Hoosick Falls, N. Y.....	1	-
7	Bay State Nursery Company.....	No. Abington, Mass.....	10	-
8	Barnes Brothers Nursery Company..	Yalesville, Conn.....	2	-
9	Bobbink & Atkins.....	Rutherford, N. J.....	3	-
10	Bogue, Nelson.....	Batavia, N. Y.....	2	-
11	Breck, Joseph & Son.....	Boston, Mass.....	2	-
12	Breck-Robinson Company.....	Lexington, Mass.....	15	-
13	Brown Brothers Company.....	Rochester, N. Y.....	4	-
14	Bryant & Ordway Company.....	Boston, Mass.....	1	-
15	Burr, C. R. & Company.....	Manchester, Conn.....	13	-
16	Central New York Nurseries.....	Geneva, N. Y.....	1	-
17	Chase Brothers.....	Rochester, N. Y.....	54	-
18	Chase, Homer N.....	Geneva, N. Y.....	22	-
19	Chase, G. H. & Company.....	Geneva, N. Y.....	1	-
20	Chase, R. G. & Company.....	Geneva, N. Y.....	3	-
21	Charlton, John & Sons.....	Rochester, N. Y.....	1	-
22	Claremont Nurseries.....	Claremont, Calif.....	2	-
23	Clark, Daniel A.....	Fiskeville, R. I.....	4	-
24	Cobb, W. F. & Company.....	Geneva, N. Y.....	25	-
25	Conrad & Jones Company.....	West Grove, Pa.....	4	-
26	Denton, William & Denton.....	Dansville, N. Y.....	1	-
27	Dingee & Conrad Company.....	West Grove, Pa.....	1	-
28	Dreer, H. A.....	Philadelphia, Pa.....	8	-
29	Educational Publishing Company...	Boston, Mass.....	2	-
30	Eliot Nurseries.....	Pittsburg, Pa.....	3	2
31	Ellwanger & Barry.....	Rochester, N. Y.....	1	-
32	Farmer, L. J.....	Pulaski, N. Y.....	3	-
33	Farquhar, R. & J.....	Boston, Mass.....	16	7
34	Farr, Bertrand H.....	Wyomissing, Pa.....	-	1
35	First National Nurseries.....	Rochester, N. Y.....	20	1
36	Fish, C. R. & Company.....	Worcester, Mass.....	4	2
37	Fottler, Fiske & Rawson Company...	Boston, Mass.....	4	-
38	Framingham Nurseries.....	So. Framingham, Mass..	2	-
39	Fraser Nursery Company.....	Genesee, N. Y.....	1	-
40	Galloway Brothers Company.....	Waterboro, Iowa.....	1	-
41	Gardner Nursery Company.....	Osage, Iowa.....	5	-
42	Glenn Brothers.....	Rochester, N. Y.....	10	-
43	Graham Nursery Company.....	Geneva, N. Y.....	5	-
44	Granyers Nurseries.....	Seabrook, N. H.....	2	-
45	Green's Nursery Company.....	Rochester, N. Y.....	106	3
46	Gregory, J. H. H.....	Marblehead, Mass.....	1	-
47	Grover, F. E. & Company.....	Rochester, N. Y.....	2	-
48	Guernsey, F. A. & Company.....	Schoharie, N. Y.....	2	-
49	Gurney, H. H. & Company.....	Geneva, N. Y.....	12	-
50	Hahn, R. A.....	Cornwall, N. Y.....	1	-
51	Hall, L. W. & Company.....	Rochester, N. Y.....	4	-
52	Harmon Company, M. H.....	Geneva, N. Y.....	5	-

	NAME.	ADDRESS.	No. of SHIPMENTS.	
			Spring.	Fall.
53	Harrison, J. G. & Son	Perlin, Md.	1	2
54	Hatch, W. H.	Providence, R. I.	1	-
55	Henderson, Peter & Company	Jersey City, N. J.	7	2
56	Hicks, Isaac & Sons	Westbury, N. Y.	1	-
57	Hill, Henry P.	Penfield, N. Y.	1	-
58	Home Garden Association	Cleveland, Ohio	1	-
59	Home Nursery Company	Dansville, N. Y.	4	-
60	Hooker, Wyman & Company	Rochester, N. Y.	8	-
61	Hosford, F. H.	Charlotte, Vt.	5	-
62	Houghton & Dutton	Boston, Mass.	4	-
63	Howe-Campbell Nursery Company	Rochester, N. Y.	1	-
64	Hoyt's Sons Company, Stephen	Canaan, Conn.	1	-
65	Hubbard, Paul M. & Company	Bristol, Conn.	1	-
66	Jackson & Perkins Company	Newark, N. Y.	1	-
67	Jones, F.	Rochester, N. Y.	1	-
68	Jordan, Marsh Company	Boston, Mass.	6	-
69	Keene Forestry Company	Keene, N. H.	1	-
70	Kelley Brothers	Dansville, N. Y.	18	1
71	Kellogg Company, R. M.	Three Rivers, Mich.	12	-
72	King Brothers	Dansville, N. Y.	12	-
73	Knight & Bostwick	Newark, N. Y.	3	-
74	Lake View Nursery Company	Sheridan, N. Y.	1	-
75	LaPointe Nursery Company	Geneva, N. Y.	1	-
76	Legg, E. P.	Boston, Mass.	1	-
77	Little Tree Farms	Framingham, Mass.	1	-
78	Lovett, J. F.	Little Silver, N. J.	-	1
79	McCabe Company, E. L.	Rochester, N. Y.	2	-
80	McCarthy, N. F. & Company	Boston, Mass.	2	-
81	McGregor Brothers Company	Springfield, Ohio	1	-
82	Maine Fruit Growers Exchange	Buckfield, Maine	1	-
83	Maloney Brothers & Wells Co.	Dansville, N. Y.	27	-
84	Maule, William Henry	West Grove, Pa.	2	-
85	Miller Company, George H.	Springfield, Ohio	1	-
86	Miller, William & Sons	Lynn, Mass.	1	-
87	Mills Seed House	Rose Hill	1	-
88	Mitchell Nursery Company	Waterville, Maine	1	-
89	Monroe Nursery Company	Dansville, N. Y.	1	-
90	Moore, W. C. & Company	Newark, N. Y.	11	1
91	Morey, J. B.	Dansville, N. Y.	3	-
92	Mount Desert Nurseries	Bar Harbor, Maine	3	-
93	Mount Hope Nurseries	Rochester, N. Y.	1	-
94	New England Nurseries	Bedford, Mass.	23	2
95	New Hampshire State Nurseries	Durham, N. H.	1	-
96	New York State Nurseries		1	-
97	Northeastern Forestry Company	Cheshire, Conn.	4	-
98	Oakland Nursery Company	Manchester, Conn.	5	-
99	Old Colony Nurseries	Plymouth, Mass.	1	-
100	Orange County Nurseries	Cornwall, N. Y.	1	-
101	Perdue, C. S.	Showell, Md.	1	-
102	Perry, Basil	Georgetown, Del.	1	-
103	Perry Nursery Company	Rochester, N. Y.	4	-
104	Peterson, George H.	Fair Lawn, N. J.	2	-
105	Pierson, A. N.	Cromwell, Conn.	1	-
106	Pomona Ten Cent Nurseries	Dansville, N. Y.	13	1
107	Pratt, Charles S.	Reading, Mass.	1	-
108	Randall, Alton E.	Dansville, N. Y.	2	-
109	Reilly Brothers	Dansville, N. Y.	7	-
110	Reilly, William J.	Dansville, N. Y.	3	-
111	Rice Brothers	Geneva, N. Y.	2	-
112	Rice, T. W.	Geneva, N. Y.	3	-
113	Richland Nurseries	Rochester, N. Y.	2	2
114	Roesch, Lewis & Son	Fredonia, N. Y.	1	-
115	Rurert, W. P. & Son	Seneca, N. Y.	16	-
116	Scott, Joseph W.	Hartford, Conn.	1	-
117	Sheerin's Nurseries	Dansville, N. Y.	5	-
118	Sherwood Farms Company	Saugatuck, Mich.	1	-
119	Sherwood Nursery Company	Odessa, N. Y.	1	-
120	Smith, W. & T.	Geneva, N. Y.	2	-
121	Spring Hill Nurseries	Tippecanoe City, Ohio	1	-

	NAME.	ADDRESS.	NO. OF SHIPMENTS.	
			Spring.	Fall.
122	Squires, H. L.	Geneva, N. Y.	2	-
123	Stark Brothers Nursery Company.	Louisiana, Mo.	13	-
124	Stark Nurseries, Wm. P.	Stark City, Mo.	16	-
125	Stevens, G. E.	Greenwood, Mass.	1	-
126	Storrs & Harrison Company.	Painesville, Ohio.	5	-
127	Stuart, C. W. & Company.	Newark, N. Y.	5	-
128	Sweet, George A.	Dansville, N. Y.	1	-
129	Taylor, H. S. & Company.	Rochester, N. Y.	1	-
130	Tennessee Nursery Company.	Cleveland, Tenn.	1	-
131	ThurLOW Sons, T. C.	West Newbury, Mass.	5	-
132	Universal Nurseries.	Geneva, N. Y.	1	-
133	Van Dusen Nurseries.	Geneva, N. Y.	6	1
134	Vaughn Seed Store.	Western Springs, Ill.	1	1
135	Vick's Sons, James.	Rochester, N. Y.	6	-
136	Vincent Greenhouses.	White Marsh, Md.	2	-
137	Wade, William.	Scituate, Mass.	1	-
138	Walsh, M. H.	Woods Hole, Mass.	3	-
139	Wells, F. W.	Dansville, N. Y.	8	-
140	Western New York Nurseries.	Rochester, N. Y.	1	-
141	West Side Nursery Company.	Worcester, Mass.	15	3
142	Whiting Nurseries.	Geneva, N. Y.	1	-
143	Wiley, H. S. & Sons.	Cayuga, N. Y.	2	-
144	Winfield Nursery Company.	Winfield, Kans.	1	-
145	Wood, Allan L.	Rochester, N. Y.	18	-
146	Wood, L. M.	Louisville, Ill.	1	-
147	Wooster, E. W.	Ellsworth, Maine.	1	-
148	Wyman Nurseries.	Rochester, N. Y.	2	-
149	Xenia Star Nurseries.	Xenia, Ohio.	1	-
	Total.		781	33

INSPECTION OF INCOMING NURSERY STOCK.

The number of shipments of nursery stock from out-of-the-state nurseries has decreased considerably during the past year. The reason for this is, probably, that discouraging prices received for fruit during the past few years have prejudiced the farmers temporarily against the setting of new stock. Excessively wet conditions that have prevailed this last year have also discouraged the public from setting ornamental trees and shrubs to the extent that they would have under favorable conditions. This is sure to be only temporary and with the coming season there will probably be an increasing number of shipments over the past year.

The report sheets that are sent by this bureau to those receiving nursery stock prove very helpful in ascertaining the condition of the stock when it arrives, classes of plants received, amount of stock in each shipment as well as other information beneficial to all concerned. The number of shipments this year have been approximately eight hundred and fourteen as compared with sixteen hundred and sixty-nine shipments

received in 1915. Only a few dissatisfactory orders were reported and the stock on the whole seemed to be quite satisfactory.

The following table shows approximately the number of fruit trees and bush fruit plants received during 1916:

Apple trees	5,522
Pear trees	924
Plum trees	761
Cherry trees	650
Peach trees	331
Raspberry plants	3,346
Blackberry plants	1,806
Strawberry plants	27,334
Currant bushes	313
Gooseberry bushes	327
Conifers	13,050
Ornamental shrubs	3,410

NURSERY AGENTS.

In spite of the decrease in nursery shipments the past year, about the same number of agents have been licensed as in 1915. The list is given below, with the name and address of each licensed agent, including the date of expiration of each license. For the sake of references, the names of agents whose licenses expired in 1916 are also included.

NURSERY AGENTS LICENSED.

NAME.	Address.	LICENSE EXPIRES.	
		1916.	1917.
Abbott, Reuben.	Thorndike.		Aug. 30
Alexander, William A.	Ellsworth.	Nov. 20	
Allen, Guy V.	Buckfield.		Feb. 4
Atwood, W. H.	Lisbon.		June 5
Bagley, James E.	Monroe.	Aug. 23	
Barker, George.	Presque Isle.	June 8	
Bisbee, Eddie J.	East Winthrop.	Feb. 5	
Bolton, F. O.	Cornish.		July 14
Bubier, T. S.	Auburn.	July 7	
Carll, Colby C.	Freedom.		July 14
Carpenter, Frank.	Houlton.		May 22
Coburn, Frank E.	Gorham.		Aug. 3
Cole, Benj. L.	Lee, R. F. D.		May 17
Cole, Harold J.	Lee.		May 18
Cole, J. D.	East Winn.		June 11
Colson, Manley D.	Monroe, R. F. D. 3.		April 30
Cushman, C. M.	Gorham, Box 66.		July 13
Dakin, E. J.	Wilton.		Mar. 9
Davis, Albert C.	So. Paris, 90 Pleasant St.		Aug. 30
Davis, E. B.	Rumford.		Aug. 1
Dolan, W. H.	Waterville, 33 Elm St.		May 14
Dow, Sewall E.	Old Town, R. F. D.	Sept. 11	
Dudley, F. H.	Auburn.	Oct. 6	
Dyer, Alden.	Franklin, R. F. D.	Sept. 4	
Earle, C. H.	Lewiston.		Dec. 16
Eaton, Samuel H.	Oxford.	July 13	
Ellingwood, A. P.	Monroe.		Mar. 25
Elliott, Harry A.	Strong, R. F. D. 2.	Jan. 23	
Farrar, Eleazer.	Guilford, Pleasant St.		July 1
Fleming, Joseph A.	Grand Lake Stream.	Sept. 13	
Foss, S. O.	Auburn, 352 Turner St.		June 1
Foster, George R.	Lisbon Falls.		May 25
Furbush, E. W.	Greene.	June 9	
Gilman, H. W.	South Berwick.		April 7
Goodwin, George E.	Berwick, R. F. D. 2.		July 5
Gordon, Wilson M.	Winn.		April 23
Gove, G. W.	Dexter.		June 17
Gray, Wm. D.	Richmond, Box 241.	May 10	
Green, M. A.	Sangerville, Box 135.	Mar. 5	
Grant Co., W. T.	Portland.		May 8
Great Department Store.	Lewiston.		July 1
Grover, M. E.	Bethel, R. F. D. 2.	June 2	
Gustin, Ivan L.	Stillwater.		Feb. 10
Hale, H. H.	South Bluehill.		Sept. 8
Harwood, A. S.	Hope.	Jan. 20	
Holt, Herbert I.	Norway.		Jan. 21
Huntress, Sarah L.	South Berwick.		Oct. 4
Jackson, N. D.	Fairfield, Box 436.	June 21	
Jefferson, W. G.	Portland, 346 Cumberland Ave.	June 1	
Johnston, O. G.	Jefferson.		Dec. 27
Kimball, G. E.	Pittsfield, 106 Main St.		July 19
Lawrence, Freeman N.	Guilford, 18 Water St.		June 6
Lee, Zina B.	Westfield.		June 6
Leighton, B. F.	Sullivan.		July 3
Leighton, I. M.	Portland, 824 Stevens Ave.		May 25
Leonard, Frank A.	Augusta, 4 Page St.	Sept. 27	
McCabe, George L.	Bangor.		July 14
McCabe, Leroy P.	Bangor, Ohio St.	June 21	
McCabe, Robert F.	Bangor, 53 Bowdoin St.	Dec. 13	
McCormick, Charles.	Kingman.		Jan. 25
McCullough, J. F.	Orono, 108 Main St.	July 22	
McQuarrie, W. S.	Fort Fairfield.		Sept. 16
MacGown, Harold L.	Harrison, R. F. D. 2.	April 29	
Maloney, M. A.	Houlton.		Aug. 22
Mayo, H. W.	Castine.		Sept. 14
Merrill, James.	Augusta, 7 School St.	Aug. 14	
Nash, A. D.	Damariscotta, R. F. D. 32.	June 3	
Norton, A. D.	Farmington.		Sept. 21

NAME.	Address.	LICENSE EXPIRES.	
		1916.	1917.
Paige, J. M.	Intervale		Dec. 30
Phillips, W. H.	Nicolin	Jan. 8	
Pinkham, C. W.	Liberty		June 28
Pinkham, Mrs. H. F.	Boothbay Harbor, Box 444		April 11
Porteous, Mitchell & Braun Co.	Portland		April 21
Powers, A. K.	Portland, 32 Vesper St.	Aug. 30	
Prescott, Emery.	Etna, R. F. D. 1		July 14
Preston, A. J.	Dennysville		June 13
Prock, Granville A.	Lincolnton		July 7
Purinton, W. S.	Augusta, 25 Melville St.	July 24	
Raymond, J. O.	Winthrop		Sept. 11
Robertson, L. C.	Weld	July 1	
Rogers, I. S.	Brownville		Aug. 14
Sawyer, C. L.	Westbrook		Dec. 2
Seavey, Jedediah	Bucksport		July 15
Senior, John C.	Sanford, 7 Lincoln St.	May 13	
Sherman, Harry L.	Gorham		Feb. 18
Shorey, George B.	Brunswick, 6 Potter St.		Sept. 1
Smith, Alfred J.	Gardiner, 20 Plaisted St.	July 6	
Smith, Isaac T.	Strong, R. F. D.	Sept. 7	
Smith, O. P.	Mexico	June 1	
Sprague, Sumner H.	Waldoboro	Feb. 6	
Staples, Nicholas	West Kennebunk	Sept. 8	
Stubbs, Elmer L.	Guilford	Mar. 18	
Tash, George W.	Strong		July 20
Thomas, Eugene	Topsham		Sept. 28
Tibbetts, J. B.	Stetson		Mar. 13
Victory, A. W.	Houlton, 50 Franklin Ave.		Aug. 17
Webber, Harrison W.	Mt. Vernon	Aug. 10	
Whitney, Fred M.	Springvale	Oct. 14	
White, Albert K.	Richmond		Aug. 30
Whittemore, F. H.	North Leeds		May 13
Williams, Fairfield	Solon		Aug. 14
Wilson, J. W.	Northwood, N. H.	July 22	
Wood, E. L.	Unity	Nov. 6	
Woodman, Fred D.	Winterport, R. F. D. 1		April 30
Woolworth Co., F. W.	Portland		April 3

APPLE SHIPMENTS.

An examination of reports relative to apple shipments of 1915 shows that only 148,266 barrels were shipped from the state last year. This was very near the amount predicted in the report of last year, but it does not show very conclusively the amount of marketable fruit that was raised, for the extremely low prices paid for apples the latter part of the fall resulted in thousands of barrels of good fruit being pressed into cider, fed to stock, or thrown away. Conditions in the apple market this fall have, however, been very much more favorable than last, and prices, which started moderately, gradually advanced throughout the season; consequently, a larger per cent of the crop is being marketed, although the quality is probably no better.

Apple prices abroad have been exceptionally satisfactory during the season and steamer space was much easier to obtain than in the two years previous. The result of this has been that a great number of apples, especially the best grades, are being exported. Freight rates have been about the same as in 1915, but the returns received for fruit have more than made up for the high rate of transportation, and most shippers have received considerably more net profit than our markets would have returned them. Merchants at Liverpool report that Rhode Island Greenings are in great demand this year and so far they have not been able to procure enough of this variety to supply the market. Starks are being bought at this writing to take the place of Greenings. Other varieties in great demand are the Baldwin and the Golden Russet, both of which have brought exceptionally good prices when properly packed.

One of the most noticeable factors in the apple market this fall has been the unusual demand for reliably packed fruit, especially the No. 1 grades, and many apple growers who are just beginning the practice of spraying, report that another year they will not only spray their fruit, but will spray more thoroughly than ever before.

Fruit Growers' Associations have sold their apples to great advantage during the year and the Maine Fruit Growers' Exchange, which was organized in 1915, reports a most successful season, 13,203 barrels of apples having been marketed at the time this report was written. Up to November 10, 8,235 barrels had netted the exchange the sum of \$25,255.87. A large amount of its fruit was sent to Liverpool with unusually satisfactory returns.

The table is given below, showing the number of barrels of apples shipped by the various transportation lines in the state, from September 1, 1915 to August 1, 1916. The actual total, as given above, is 148,266 barrels as compared with 598,487 barrels in 1914.

Following the usual custom, a list of the twelve largest shipping stations is also given.

BARRELS OF APPLES SHIPPED FROM SEPT. 1, 1915, TO AUG. 1,
1916.

	Barrels	Boxes
Maine Central R. R.	99,193	
Boston & Maine R. R.	24,122	
Eastern Steamship Co.	14,500	3,000
Grand Trunk Ry.	8,626	
*Wiscasset, Waterville & Farmington Ry..	3,767	
*Georges Valley R. R.	3,227	
†Bangor & Aroostook R. R.	2,162	
*Bridgton & Saco River R. R.	766	
*Bangor Ry. & Electric Co.	659	
<hr/>		
Actual total	148,266	

*Transferred to another road.

†Transferred to another road, 337.

SECOND CARLETON CONTEST.

Inasmuch as several of the yearly reports of the contestants in this contest have not been received as yet by this bureau, a conclusive tabulation of cost accounts, methods of pruning, cultivation, fertilization, etc., of the past year, cannot be given at this time. The regular report of this contest which is made yearly will be prepared in a few days, however, at which time these various items will be tabulated.

Two years of this contest are already completed and, with a comparatively small number of contestants remaining to compete for the Gregory prize and additional offerings, a great deal of interest is sure to be manifested during the coming three years, at the end of which time the prizes for this contest will be awarded. Three contestants have recently announced their intention of withdrawing from the contest, which leaves sixty-three at the present writing. The reasons for these withdrawals have been, in every instance, either on account of excessive moisture or inferior stock. The sum total of all the prizes offered at this time amounts to about \$600 which should be a sufficient inducement for an effort on the part of each contestant.

During the year each one of the orchards has been visited by either Mr. Eaton or myself and suggestions made when requested. Notes were taken on the condition of each orchard and very good results obtained on the part of both this bureau and the growers. Several growers have requested that an inspection of the orchards be made early the coming spring for the purpose of giving advice relative to pruning of the trees, which is a very important factor in obtaining best results. This would seem to be a very good plan, provided that the rush of other work does not interfere.

Respectfully submitted,

CLYDE L. WILKINS,

State Horticulturist.

REPORT OF ASSISTANT HORTICULTURIST.

To Hon. W. T. Guptill, Commissioner of Agriculture:

I respectfully present my report as Assistant Horticulturist from June, 1916, to January, 1917.

I have visited thirty-five nurseries in the state on inspection work. The condition of the nurseries I found to be generally good. They are growing ornamental trees, flowering shrubs, roses, perennials, berry plants, currants, gooseberries and evergreens. A number of the nurseries that are growing raspberry, blackberry and strawberry plants; a few nurseries grow apple trees, very few plum, pear and cherry trees. The growing of evergreens is quite extensive.

In the Carleton orchards that I have visited I find that the growers are taking an interest in their orchards, and they were pleased to receive all the information that I could give them in regard to their care and cultivation. Most of the orchards looked very well and care had been taken of the trees. The cultivation was quite good. I believe the Carleton Contest is a very good thing for the State of Maine. It creates an interest in orcharding, helps the farmers strive to make their orchards better, and brings them closer to the Department of Agriculture, with mutual benefit for us all.

In my opinion, what we want in Maine is for all to pull together for the grand old state. Let the country and the world at large know what we are raising here. Let them know the natural advantages we have and the splendid sites for orchards that can be bought at a very reasonable price.

The quality of Maine apples is equal to apples grown anywhere. Their keeping quality is very good, which is a decided advantage to our Maine farmer. The price of Maine grown apples has been very good this season and there has been a good demand for them from different section of this country. They also have brought a very high price from across the water.

I have visited a number of towns and cities with the apple inspectors. Quite a large shipment of apples have been sent out of the state this year. I was treated with courtesy by the packers and farmers. The apples in some sections have had queer looking spots on them. In many of the orchards the apples were greatly affected, and, while I do not know what is the cause of the spots, it has been a serious thing for the farmers, as a great many apples affected were of good size and color and free from worm-holes.

I attended the exhibition of the Maine State Pomological Society at Portland. The exhibit of fruit and flowers was very fine, some of the box fruit being very attractive. It shows what can be done with Maine grown fruit and helps advertise what Maine is doing in orcharding. The more we can bring our fruit to the attention of the people, the more and better markets we can secure for our fruit.

WHITE PINE BLISTER RUST.

I have visited with Mr. Posey, the federal inspector, York, Cumberland and Androscoggin counties. In Springvale, York county, we found, in a swamp, infections of White Pine Blister Rust on the leaves of the wild skunk currant. On the road from Lewiston to Lisbon we found currant bushes growing in a field near a barn, where leaves were badly infected with Blister Rust. We went across the road into a grove of white pines and found the disease on them. The worst infection we found was beyond Riverton Park, near Portland. Mr. Posey and Mr. Wilkins accompanied me. Some of the pine trees were badly diseased. This disease is very dangerous to our white pine forests of Maine. We must do something to protect our white pines from infection from currant and gooseberry bushes, either cultivated or wild. As I understand the disease, it cannot spread from pine to pine, but has to go from the pine to the leaves of currant and gooseberry bushes, the alternate host, and then goes back to the pine in a seed (spore). It can live on all kinds of five-leaf pines, but does not live on the three-leaf or two-leaf pines.

Maine has a great amount of valuable white pine forests. A great industry comes from the lumbering interests of our state,

and something should be done to save our white pine forests from this disease.

I wish to strongly emphasize the necessity of removing the currant and gooseberry bushes that are growing in the near vicinity of white pine forests. From the knowledge obtained, it appears that the spraying of trees will not prevent the disease.

BEAUTIFYING THE FARM HOMES.

It has been my pleasure to assist in giving information in the arrangement of flowering shrubs, plants and ornamental trees. The arrangement of the shrubs is of as much importance as the shrubs themselves. The massing together of the flowering shrubs, so that the high growing varieties are together, with the small growing kinds in the front, so that the whole bed can be seen, adds greatly to the beauty of the grounds.

I believe if the people of Maine will only consider the idea of making their homes more beautiful by the planting of shrubs, roses, ornamental trees and perennials, that their farm, village and city homes will increase in value—and not in value alone, but they will have the satisfaction of having their homes attractive, even if the homes are not so grand as some of their more fortunate friends. We can point with pride to the plants and trees that help make our state more beautiful.

I had the pleasure of attending, by invitation, the Grange at Monmouth, on November 1, to address them on Beautifying the Farm Home. Those present were very attentive and were glad to receive all the information that I could give them, and showed, by their attention and the many questions that they asked me, that they were endeavoring to make their homes more attractive.

In conclusion, I will say that, with a little effort on our part and a small amount of money expended, we can make our homes more beautiful, add to the value of our property, and it may be the means of inducing people from other parts of the country to buy homes and locate in Maine, and thus add to the prosperity of our state.

Respectfully submitted,

S. H. EATON,

Assistant Horticulturist.

REPORT OF FIELD AGENT GYPSY MOTH WORK.

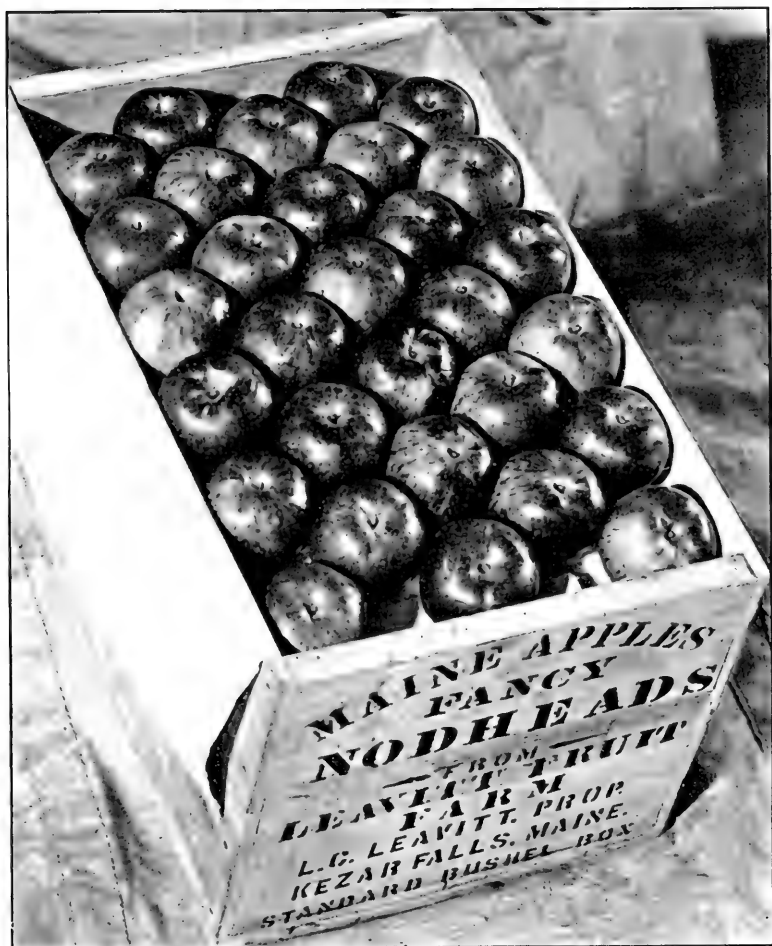
Hon. W. T. Guptill, Commissioner of Agriculture:

In submitting my report to you for the year 1916, I will begin by saying, no man can achieve results, gratifying to all sections of the state, unless he is supplied with sufficient money to carry on the work; and I will emphatically say, less than \$50,000 is not sufficient.

The work this year consisted chiefly of parasitism and checking the spread of the moth. Both results were satisfactorily accomplished. During the spring and early summer the field force was sadly handicapped by continuous wet weather. We deluded ourselves with the thought that the continuous rains would have a tendency to give us an equitable reparation for the loss of time entailed by the field force, by causing a prevalence of wilt disease in the gypsy moth. But it proved otherwise. It resulted only in impeding the work in the badly infested area. The wilt did appear in some localities, especially in York county, but not in sufficient quantity to be a resultant factor in decreasing the number of larvæ that the field force would have done had the weather permitted them to work. The persistent effort which the crews displayed in vying with each other in their respective territories, was a large factor in overcoming the stunted appropriation we had to work with.

Our work on parasitism has been most gratifying and should appeal to everybody in the infested area. There has been no section of that area neglected. Thousands of parasites have been liberated under the able supervision of John Cleary. How well this work has been accomplished is apparent by the absence of the brown-tail moth in many sections, and will bear him testimony, while the perceptible decrease in all sections is a monument to his ability.

I notice a great many people are afflicted with the erroneous belief that we have a new and serious outbreak of the gypsy



Box of Maine Nodheads, Portland, Nov. 14-16, 1916.

moth. My attention has been called to this belief a great many times this fall. It is no such thing; it is simply the people themselves who are learning more about the gypsy moth. We made it a rule to teach the people all about this interesting creature, showed them where to look and how to control them, with the result that the people now can discern them at a glance, whereby, previous to this teaching, they paid little or no attention, whatever, to the moth. It is their own knowledge of the moth and its habits that now happily enables them to see a few, where before they could not see thousands.

I would like to impress upon those who have suffered from the ravages of this pest, the necessity of appearing before the next legislature, and use their every effort to get an appropriation of not less than \$50,000, annually.

The following cities and towns were inspected by crews the past year and the number of moths destroyed in each was as follows:

Alna	12,819	Lebanon	5,911
Auburn	710	Scarboro	1,217
Bath	2,929	Saco	2,010
Berwick	13,140	Sanford	230,746
North Berwick	19,864	Westbrook	46,323
South Berwick	19,450	Woolwich	30,190
Cape Elizabeth	359	Windham ..	9,235
Gardiner	222	Lewiston	437
Hallowell	2	Augusta	13
Nobleboro	371	Kennebunkport	7,587
Portland	3,517	Lisbon Falls	37
South Portland	13,663	Peaks Island	2,312
Kennebunk	7,056	Long Island	29
Richville	14,171		

Total egg-clusters destroyed, 374,807.

TOWNS COLONIZED WITH PARASITES.

	Apanteles.	Compsilura.	Meteorus.
Wiscasset	2 colonies		
Pittsfield		1 colony	
Old Town		1 "	
Whitneyville		1 "	
Waterboro		1 "	
Dennysville		1 "	
Bar Harbor		1 "	
China		1 "	
Anson		1 "	
Gilead		1 "	
Arrowsic	1 colony		1 colony
Whalebone Island..		1 "	
Webster	1 "		
Standish	1 "		
Sebago	1 "		
Limington	2 colonies		
Monmouth		1 "	
Dexter		1 "	
Cherryfield		1 "	
Gardiner		1 "	
Waterboro Center..		1 "	
Ellsworth		1 "	
Winterport		1 "	
Roxbury		1 "	
Webster		1 "	
Warren		1 "	
West Bath			2 colonies
Sabattus	1 colony		
Parsonsfield	1 "		
Cornish	1 "		
Georgetown	1 "		

In addition, the United States Department also liberated about 2,000 colonies of the *Anastatus Bifasciatus*, a minute parasite that feeds on the embryonic egg of the gypsy moth. This work was done in the badly infested colonies of York county. The Maine Department aided the Government crews in liberating those parasites.

Burlap this year reached a selling price that made it almost prohibitive, and if some of the towns burlapped had not aided in the purchase we would have been forced to dispense with this part of the work. The towns aiding in the work were Wells, Lisbon Falls, the cities of Bath and Biddeford.

Biddeford purchased 2,000 yards, which gave us a working capacity of 10,000 yards. I feel that we can utter no praise too great for those towns that were so loyal to the State Department in this work. I will also say that mere words cannot express my gratitude or appreciation to the state officials who have so materially aided me with their advice, and by their kindly interest in my work, during the past two years. I will also make special mention of Inspectors Flynn and Gross, and the crews under their charge, for the faithful and efficient service rendered the state during their term of office.

Respectfully submitted,

ED. J. CADEY,

Special Field Agent.

REPORT OF DEPUTY STATE SEALER OF WEIGHTS AND MEASURES.

To the Hon. William T. Guptill, Commissioner of Agriculture:

I respectfully submit to you my annual report as Deputy State Sealer of Weights and Measures.

The condition of the scales in use in the cities and towns of the state shows improvement each year. Merchants are replacing the old type of scales with modern computing scales to a large extent. This tendency we expect will extend to the improved dormant platform scales now on the market.

The public shows much interest in the enforcement of the law, as is shown by frequent inquiries as to local conditions, especially as to automatic gasoline pumps. We think these pumps should be tested more than once a year, as they are liable to get out of order when in constant use. There has been some complaint of short measure from these gasoline pumps. There is very little doubt but that, in a short time, pumps with a glass measuring chamber will come into general use. Then the operation of the apparatus may be observed.

There has been some complaint of short weight, but not so much as in former years. Most merchants buy and sell by weight at the present time many commodities formerly sold by measure, for instance, beans, potatoes, spinach, etc., when ordered by the quart or peck, are weighed, not measured. The consumer should know how many pounds he is entitled to, and in order to do this he must become familiar with the standard weight per bushel of the different commodities.

I have visited eleven counties and interviewed the local sealers and municipal officers as my duties required. In many cases the selectmen have not attended to their duties, and think, after they have appointed some person as sealer, they have done their whole duty, no matter whether the appointee ever tests a scale or not.

The sealers in some towns who have not attended to their duties give as a reason the fact that they found everything all right last year and did not think it necessary to do the work of testing again this year. Now the law says very plainly (Chapter 48, Section 13-15, Revised Statutes of 1916) that the scales, etc., must be tested annually.

In many cases I find the local sealers do not have a complete outfit and are unable to adjust weights if they find them light. Every sealer should be furnished with a proper outfit by the town officers.

Our experience is that a great many weights are light when the scales are all right. Now, an error of one-sixteenth of an ounce at the counterpoise means an error of six and one-fourth ounces on the platform, as the leverage of most scales is 100 to 1 and some dormant scales 200 to 1. The weights are readily adjusted if there is a portable drill, punches, etc., in the outfit.

I have visited the following state institutions for the purpose of inspecting, weighing and measuring devices:

The State Hospital, Augusta.

The State Hospital, Bangor.

The State School for the Blind, Portland.

The Maine Experiment Station, Orono.

The State Prison, Thomaston.

The State School for Girls, Hallowell.

Central Maine Sanatorium, Fairfield.

Maine School for Feeble Minded, Pownal.

At the Augusta State Hospital they have installed in the boiler room a set of track scales of 10,000 pounds capacity for checking in their coal. This has been tested and sealed. The wagon scales for weighing farm products were rebuilt in May and are now practically as good as new. These scales, as well as all other scales in this institution, have been tested by the local sealer and are correct.

At the Bangor State Hospital all the scales have been tested and sealed, except the old Howe scales in the storeroom. This has been replaced by a new Fairbanks of the same capacity. The steward is now able to check all supplies accurately.

At the State School for the Blind at Portland I found scales for weighing broom corn in bales, which were also used in the manufacture of mattresses, brooms, etc. They use no checking system on coal or food supplies.

At the Maine Experiment Station, Orono, I found the scales in the various departments well adapted to the uses to which they are put. The large cheese factory scales used in the dairy to weigh the milk after mixing are in fine condition, as well as the Chatillion milk scales in the barn by which they weigh the milk of individual cows. They fill sixteen one-quart sealed fiber containers at one time from a tank and sell to the customers by this measure.

The scales at the State Prison, Thomaston, were found to be correct and sealed, except the platform scales in the storeroom. The rear end of the platform on these scales is broken off. The scales are badly rusted and were balanced with difficulty. It shows an error of two ounces on a draft of twenty-five pounds, and the error multiplies as test weights are added. This should be replaced by new scales of one thousand pounds capacity or more, or, better still, by a set of beef track scales, such as they have at the Bangor State Hospital.

The scales at the State School for Girls at Hallowell are, with two exceptions, entirely unfitted for the use made of them. The scales used in checking supplies in kitchen are not reliable. They cost about ninety-eight cents, so could easily be replaced. The same applies to the small scales used in the infirmary. The platform scales in the basement and the Jones scales in infirmary are old and were adjusted with some difficulty. There are no scales for weighing coal and I think the money expended for a good checking system here would be justified by the saving.

At the Central Maine Sanatorium, Farifield, they have a Jones platform scale in the infirmary which tested out all right, as did the cheap "Family" scale used in the storeroom to check out food supplies. They have no scales with which to check in coal and other supplies.

At the Maine School for Feeble Minded, Pownal, I found a Knowles platform scale which proved correct when tested, but the Family scale, so called, used in the kitchen for checking out supplies, was short an ounce or two-pound test weight.

but at six pounds, was correct. I have found ninety-eight cent scales at a number of institutions where they were entirely unfitted for the use made of them. Their other scales answer very well the purpose to which they are put. There is no checking system.

There has been no change in the number of manufacturers of milk bottles and milk containers who have filed bonds. The following manufacturers of milk bottles and milk containers have filed bonds with the State Treasurer in compliance with Section 20 of Chapter 27 of the Revised Statutes, relating to the sealing of milk bottles and jars, and the following designating numbers assigned:

The Thatcher Manufacturing Co., Elmira, N. Y. Maine Seal No. 1.

Poughkeepsie Glass Works, Poughkeepsie, N. Y. Maine Seal P—3.

Travis Glass Co., Clarksburg, W. Va. Maine Seal T—19.

Essex Glass Co., Mt. Vernon, Ohio. Maine Seal E—4.

Fidelity Glass Co., Tarentum, Pa. Maine Seal F—2.

Weis Manufacturing Co., Monroe, Mich. Maine Seal E—5.

Wisconsin Fibre Bottle Co., Milwaukee, Wis. Maine Seal W. F. B. Co.—W. 019.

There was no convention of the local sealers this year, which is very much regretted by this Department, as the local sealers learn much of value regarding the different ways of evading the law by dishonest dealers, and the newly appointed sealers learn much that is of great importance in testing and adjusting scales.

Last year we had reports from local sealers in two hundred and eighty-six cities and towns. This year we have had reports from three hundred and twelve cities and towns, showing a slight increase over last year, as given by table on following page.

In conclusion, I wish to express my thanks for your kind advice and hearty coöperation in all matters pertaining to this office.

Respectfully submitted,

PERCY S. EDGECOMB,

Deputy State Sealer.

REPORT OF THE BUREAU OF MARKETING AND
SUPPLIES.

To Hon. W. T. Guptill, Commissioner:

In taking up the work of this Bureau in the midseason of 1915 I was somewhat handicapped, owing to the attitude of my predecessor who has apparently striven to discredit any further work emanating from this office. I wish to say, however, that, on the whole, my relations with the managers and members of the Farmers' Unions have been very pleasing and I have found them ever ready to render valuable assistance.

Everybody will agree that we can improve our farming, and our farmers have realized for years that the real farm question in America is not to produce *more*, but to sell at *better advantage what is produced*. This means better business, not only for the farmers but for the merchant and manufacturers as well, for the earth, with its mineral and agricultural store, is the basis of all wealth, and upon the success of the farmer depends the happiness and prosperity of the Nation.

Some advocate, as a panacea for the farmers' troubles, increased production, but what we really need is a better system of marketing and exchange; a better system of buying and selling. Farmers have been working at this problem, but usually each man for himself. In the problem of marketing, of finding a buyer, it is the consensus of opinion that agriculture is in a bad way. So common are the instances that it is hardly worth while to cite cases where the consumers have paid fancy prices for an article of food while the farmers, fifty miles away, have this same article and no market for it. Thus we see that our system of distribution is radically wrong. In the marketing of farm products it is necessary to have some intermediary agent, or agents, between the producer and the consumer, either in the form of brokers, commission men or some other agency. The methods practiced by many of these agencies and the small returns, compared with the prices the

consumer was forced to pay, led the farmers and fruit men to combine, which resulted in a wave of coöperation sweeping over this country.

There is need, however, of interesting more than the farmers in this movement, for prosperity in farming means national prosperity. Coöperation in Europe where farmers buy together, sell together, borrow or lend together, own machinery together, and, in some cases, actually carry on a farm together, has reached a higher development than this country; there being 25,000 coöperative societies in Germany alone, and the present strength of her armies, in the field, is made possible only by her agricultural strength. Coöperation in this country has reached a much higher development in the West than in the East. In the West the growers of citrus fruit have so perfected their organizations that their business is done at a minimum expense, and large sums are being expended, annually, to advertise their products.

Our farmers had long felt the need of assistance in marketing the products of their farms and buying their supplies, and, with the example before them of the success of the large commercial enterprises which were incorporated for the protection and advancement of their business interests, coöperation seemed the hope of the future and the logical way for the farmers of Maine, by acting together, to secure a larger portion of the consumers' dollar. The years 1911 and 1912 saw the birth of the Farmers' Union in Maine. The third Union was incorporated at Dexter, this Union shipping about one-third of the total amount of potatoes marketed by all the Unions that season. The work of organizing the farmers has gone on until, to date, there have been eighty-six Farmers' Unions organized in the state.

We also have an efficient organization for the marketing of fruit, known as the Maine Fruit Growers' Exchange, composed of thirteen branch organizations, located throughout the central and western parts of the state, and under the capable management of E. E. Conant of Buckfield. It has been aptly stated that "Men may fail, but coöperation does not fail," and many coöperative efforts have proven barren of the best results, owing to the lack of capable management.

The success obtained this season by the apple organizations shows what coöperation can accomplish when properly managed. The apples shipped to the foreign markets show an average net return, at loading stations, of approximately \$4.50 per barrel for No. 1's, No. 2's, and unclassified. The season of 1915 was a poor apple year and only 3,000 barrels were handled by the Exchange. This season, however, there has already been shipped 17,000 barrels and the following is a copy of a report of apple shipments which came to the Department through regular correspondence:

“LIVERPOOL, ENGLAND, Dec. 11, 1916.

“*Dear Sir:*

“The tide still flows, and strongly so, in favor of those *growers* and *orchardists*, in the *State of Maine*, who are entrusting us with the sale of their apples at the British markets.

“We give you herewith net returns (per barrel) back at *loading stations*, on several car-loads entrusted to our care per steamship ‘Canadian’ and steamship ‘Sagamore.’

“Time and space will not permit of our giving you returns on all the consignment received by us from *growers*, many of which consist of small lots of 5, 10, 15, 20, 30 barrels and upwards.

“At the same time it will interest you to know, that our returns, on these small lots, have been, in many instances, equal to the highest returns, and in no instance, lower than our lowest returns given you herewith.

“Steamship ‘Canadian’ sold at *Liverpool*, 29th Nov. to 6th Dec., *two* car-loads from *East Hebron*:

	Per barrel	Loading station	
No. 1 Baldwins	\$5.48	“	“
No. 2 Baldwins	4.13	“	“
Unclass. Baldwins	3.97	“	“
No. 1 Greenings	5.80	“	“
No. 2 Greenings	4.90	“	“
Unclass. Greenings	3.55	“	“
No. 1 Starks	4.21	“	“
No. 1 Ben Davis	4.03	“	“
Unclass. Ben Davis	3.27	“	“

No. 1 Ganos	4.03	"	"
Unclass. Ganos	3.35	"	"
No. 1 Golden Russets	6.29	"	"
Unclass. Golden Russets	4.95	"	"
No. 2 Spies	4.68	"	"
Unclass. Spies	4.01	"	"
<i>"One car-load from Cornish:</i>			
No. 1 Baldwins (many slack)...	\$4.76	"	"
No. 2 Baldwins " " ...	4.00	"	"
No. 1 Ben Davis " " ...	3.61	"	"
No. 2 Ben Davis " " ...	3.00	"	"

*"Steamship 'Sagamore' sold at Liverpool, 4-6th, Dec.,
one carload from East Hebron:*

	Per barrel	Loading Station	
No. 1 Baldwins	\$5.44	"	"
Unclass. Baldwins	3.97	"	"
No. 1 King Pippins	4.93	"	"
Unclass. Kings	4.04	"	"
No. 1 Bellflowers	2.00	"	"
No. 2 Bellflowers	1.41	"	"
No. 1 Greenings	5.57	"	"
No. 2 Greenings	4.48	"	"
Unclass. Greenings	3.92	"	"
No. 1 Seeks	4.30	"	"
Unclass. Seeks	3.72	"	"
Unclass. Spies	3.72	"	"
Unclass. C. Reds	3.43	"	"

"One car-load from Brownfield:

No. 1 Baldwins	\$4.02	"	"
No. 2 Baldwins	3.56	"	"
Unclass. Baldwins	3.40	"	"
No. 1 Ben Davis	3.96	"	"
No. 2 Ben Davis	3.27	"	"
No. 1 Spies (poor)	2.95	"	"
No. 2 Spies "	2.91	"	"
Unclass. Spies "	3.02	"	"
No. 1 Greenings	5.42	"	"
No. 2 Greenings	4.20	"	"

Unclass. Greenings	4.14	"	"
No. 1 R. Russets	4.28	"	"
No. 2 R. Russets	3.58	"	"
No. 1 Starks	3.95	"	"
No. 2 Starks	3.36	"	"
No. 1 Hubbardston	3.63	"	"
Unclass. Hubbardston	2.92	"	"
No. 1 Blue Pearmain	2.92	"	"
No. 2 Blue Pearmain	2.74	"	"
No. 1 Gilliflowers	2.50	"	"

"Yours faithfully,

....."

Coöperative buying and selling is organized buying and selling, the members being left free to specialize in production, their natural field of endeavor, and unite in hiring proficient ability for the above-mentioned purposes. A prime necessity, therefore, is, that the basis of organization should be such as to adequately carry on the work for which it is intended; should be capable of allowing natural growth of the business, and for this purpose strict attention should be paid to modern business principles and methods.

While the organizations in this state have been successful in drawing the farmers closer together in their business relations, there is yet much to be accomplished, both in the purchasing of supplies and the disposing of their products. It is much easier to exchange money for goods than it is to find a customer for what you have to sell. One could hardly go wrong this season in the purchase of feeding stuffs and flour, for the market has been of an upward tendency and the results obtained for the past few months should not be taken as an example of what may be expected of changed business conditions, following a reaction of the market. Something, however, seems to be wrong with our coöperative system of sales and distribution; as the average results do not appear to reflect any marked improvement on the old system of selling through brokers, and a reorganization or change of policy in our selling system seems inevitable, if we would accomplish in Maine what we desire to accomplish.

In order that the present large losses of potatoes may be eliminated and that conditions in the potato growing industry may be bettered in general, growers should exercise more care in the digging and handling of their tubers and work towards the establishment and strict observance of grades.

The office of rural organization of the United States Department of Agriculture, while it does not make specific recommendations for the adoption of standard grades, does, however, for the assistance of those interested in bringing about standardization, suggest that two regular, and perhaps a special grade for extra fancy potatoes, would meet the market needs.

It is suggested that specifications for the No. 1 grade should be drawn to make it as good and attractive in appearance as is reasonable and practicable. These specifications should practically eliminate potatoes damaged by frost, sunburn, blight, common scab, dry rot, decay, second growth, cuts, bruises, dirt, also undersized or coarse stock. The minimum and maximum sizes for No. 1 and No. 2 grades are still a subject for careful investigation, discussion and demonstration. However, a minimum of about two inches is maintained for grade No. 1 in a number of early or new potato sections, and the commonly discussed minimum for this grade is from one and seven-eighths to two inches. The minimum diameter for a long variety should be, probably, a little smaller than for a round one. Since it is practically impossible in grading any perishable products, commercially, to secure a perfect grade, reasonable tolerances should be allowed. The No. 2 grade should include the better of the remaining potatoes.

The studies of the market specialists of the department indicate that there is an unnecessary diversity in the containers for potatoes in use. These now range from the one-bushel hampers, for the early Florida crop, to double-headed barrels. The two-bushel 1200-pound burlap bag is suggested as, perhaps, the most satisfactory container for general use. The lack of proper grading and packing, the specialists say, causes a large part of the marketing difficulties now experienced in the potato trade.

As a higher standard of grading is advantageous and insures higher prices, I would cite as an example the success of the

farmers of the eastern shore of Virginia, who, by a strict observance of grades and by marketing their potatoes under a special brand, obtain a premium over the market price for well-sorted goods. There is a class of trade which is willing to pay for a first-class article, if they can be assured that they may obtain it at all times and I have seen high-priced labor in the city sorting our best Maine stock and making three grades. The first two grades, I was informed, would sell for more money than the entire bulk of potatoes would sell for, ungraded. The New York Department of Pure Foods and Markets is working on a plan of large terminal warehouses, where the products of the farm can be sold by private sale and public auction direct to the stores and consumers at a minimum of expense, as compared with our present expensive system of distribution.

Owing to the high cost this season of the ingredients used in fertilizers, I am led to believe that some manufacturers have resorted to the use of leather scrap and wool-waste, more than usual. While these are rich in nitrogen, they are slow to decay and, therefore, are not regarded as an economical source of this element. When dissolved with acid or treated in such a way as to render them more immediately available, they may be used to advantage, though the cost of such treatment is usually so great as to make it impossible to thus improve their form and still be able to compete, commercially, with the other nitrogenous products.

There is, also, another cheap form of nitrogen known as cyanamid, which will be used quite extensively this year in the composition of fertilizer. This is an available source of plant food, but must be used intelligently. If much cyanamid is present in the fertilizer, and it comes in direct contact with the seed, it tends to destroy its germination, which would result in a poor stand of potatoes. Therefore, where a ton of fertilizer containing cyanamid is used, it would be advisable to broadcast a good portion of it and thoroughly mix with the soil, thus eliminating the aforementioned danger.

Cyanamid is obtained by extracting nitrogen from the air and the Government, as a part of its preparedness plan, appropriated June 3, 1916, \$20,000,000 for the establishment of a nitrate plan for the extracting of nitrogen from the air. This will be

used for the manufacture of explosives, in case of war, and in times of peace, can be utilized for the production of nitrates for use in agriculture, so as to cheapen food supplies by increasing its production through the agency of a low-priced fertilizer.

It is, perhaps, not generally known that the price that the farmers of Maine have been obliged to pay for their fertilizer ranges from six to seven dollars per ton more than more favored states. This means that, considering the added expense of shipment to Maine, we pay from three to four dollars per ton more than the same analysis is sold for elsewhere.

The short crop of potatoes this season has caused prices to rule high on both table and seed stock. In our efforts to improve conditions and secure a wide distribution of our products, more attention should be paid to the importance of growing more seed of the better class, in order to supply an increasing demand for our northern grown potatoes for planting purposes.

The southern states are planting larger areas of potatoes each year and they have found that northern-grown seed from Maine gives better results than from seed obtained elsewhere. There is a great opportunity for developing our seed trade with the South and the work already done has resulted in hundreds of inquiries regarding Maine seed. Upon a recent trip through the South, I came in personal contact with large interests which were not only ready, but anxious to make arrangements for the purchase of Maine certified seed.

Respectfully submitted,

F. L. HUTCHINSON,

Chief, Bureau of Marketing and Supplies.

REPORT OF THE CHIEF OF THE BUREAU OF INSPECTION ON THE ENFORCEMENT OF THE PURE FOOD LAW.

To the Hon. William T. Guptill, Commissioner of Agriculture:

I respectfully submit to you my report of the work covered by the Bureau of Inspection for the year 1916.

In general, the work of the Bureau through the year has been to carry out the duties as delegated by chapter 36 of the Revised Statutes: To enforce the laws regulating the sale of agricultural seeds, commercial feeding stuffs, commercial fertilizers, drugs, foods, fungicides and insecticides; the "net weight law" so called; the prevention of sophistication or adulteration, and the detection of misbranding or fraud. The duties of the Bureau also embrace the annual registration of commercial feeding stuffs, commercial fertilizers, fungicides and insecticides. In order that these goods may be legalized for sale, the law requires the filing of a manufacturer's certificate—containing the guaranteed chemical analysis—and the payment of a proper registration fee for each and every brand, thus necessitating a large amount of correspondence in this branch of the work.

Some changes have been inaugurated during the year 1916 with particular reference to the taking of fertilizer samples. The same idea has been carried out, too, which started in 1915, with relation to samples of fertilizers and seeds, in that these samples bore no descriptive information other than the index number when sent to the Experiment Station, and not until the reports of analyses were returned to the Bureau of Inspection was the complete history of any sample communicated to the Experiment Station for compilation in the official inspections, published by the director according to law. Another departure from the plan of previous years was that, instead of drawing fertilizer samples from five or ten packages and from these several portions making up a composite sample for analysis, the

samples for 1916 were—without exception—drawn from a single package of the brand in question, and rules to that effect were issued to the fertilizer inspectors.

The season of 1916 has also been marked by particularly new activities along different lines of food factory inspection, with special reference to a continuation of the inspection of sardine factories and the initiation of a new system of inspection for the blueberry canning industry; also, to a rather complete inspection of the corn factories of the state.

The blueberry canning industry is one for which our state is noted; it is peculiar to our state, but in the past little attention has been given to it—from the standpoint of inspection—and really very little has been known concerning it. There are great possibilities in the blueberry canning industry, however, and we feel that considerable good has been accomplished as a result of the inspection work.

Another innovation in the inspection work has been the employment of an automobile and joining forces with the Bureau of Weights and Measures; in this manner the inspection of small country grocery stores has been carried on. This work, which was conducted wholly along educational lines—it being our first visit—has been productive of wonderful results.

The following tables and figures are submitted, with the idea of communicating to the public the number of people and the amount of territory coming under our system of inspection for the year 1916. It will be noted that 286 towns and cities of the state have been visited for the purposes of inspection:

CITIES AND TOWNS VISITED AND INSPECTED, 1916.

CITY OR TOWN.	COUNTY.	Number Times Inspected.	Population.
Abbot.....	Piscataquis.....	2	705
Addison.....	Washington.....	2	985
Albion.....	Kennebec.....	2	922
Alfred.....	York.....	1	890
Alna.....	Lincoln.....	2	457
Anson.....	Somerset.....	4	2,209
Appleton.....	Knox.....	1	842
Ashland.....	Androscoggin.....	1	2,173
Atkinson.....	Piscataquis.....	1	528
Auburn.....	Androscoggin.....	8	15,064
Augusta.....	Kennebec.....	9	13,211
Baldwin.....	Cumberland.....	2	791
Bangor.....	Penobscot.....	11	24,803
Baring.....	Washington.....	1	228
Bath.....	Sagadahoc.....	8	9,396
Belfast.....	Waldo.....	6	4,618
Benton.....	Kennebec.....	2	1,194
Berwick.....	York.....	4	2,098
Bethel.....	Oxford.....	2	1,930
Biddeford.....	York.....	6	17,079
Bingham.....	Somerset.....	1	775
Blaine.....	Aroostook.....	2	1,013
Bluehill.....	Hancock.....	2	1,462
Boothbay.....	Lincoln.....	2	1,700
Boothbay Harbor.....	Lincoln.....	5	2,021
Bowdoin.....	Sagadahoc.....	2	814
Bowdoinham.....	Sagadahoc.....	3	1,385
Bradford.....	Penobscot.....	3	930
Bradley.....	Penobscot.....	2	634
Bremen.....	Lincoln.....	1	550
Brewer.....	Penobscot.....	6	4,835
Bridgewater.....	Aroostook.....	1	1,013
Bridgton.....	Cumberland.....	3	2,660
Bristol.....	Lincoln.....	1	2,415
Brooklin.....	Hancock.....	2	936
Brooks.....	Waldo.....	1	704
Brownfield.....	Oxford.....	2	933
Brownville.....	Piscataquis.....	2	1,808
Brunswick.....	Cumberland.....	8	6,621
Buckfield.....	Oxford.....	2	1,087
Bucksport.....	Hancock.....	2	2,216
Burnham.....	Waldo.....	2	733
Burlington.....	Penobscot.....	1	370
Buxton.....	York.....	1	1,675
Byron.....	Oxford.....	1	187
Calais.....	Washington.....	5	6,116
Cambridge.....	Somerset.....	1	369
Camden.....	Knox.....	3	3,015
Canaan.....	Somerset.....	1	874
Canton.....	Oxford.....	2	1,013
Cape Elizabeth.....	Cumberland.....	1	1,857
Caribou.....	Aroostook.....	3	5,377
Carmel.....	Penobscot.....	2	1,050
Castine.....	Hancock.....	1	933
Charleston.....	Penobscot.....	4	861
Chelsea.....	Kennebec.....	1	3,216
Cherryfield.....	Washington.....	5	1,499
China.....	Kennebec.....	2	1,297
Clinton.....	Kennebec.....	2	1,268
Columbia.....	Washington.....	3	564
Columbia Falls.....	Washington.....	6	663
Corinna.....	Penobscot.....	4	1,237
Corinth.....	Penobscot.....	2	1,042
Cornish.....	York.....	3	954
Cumberland.....	Cumberland.....	3	1,403
Cushing.....	Knox.....	1	535
Damariscotta.....	Lincoln.....	3	771
Danforth.....	Washington.....	4	1,295
Denmark.....	Oxford.....	1	596
Dennysville.....	Washington.....	1	459
Detroit.....	Somerset.....	2	461

CITIES AND TOWNS VISITED AND INSPECTED, 1916.

CITY OR TOWN.	COUNTY.	Number Times Inspected.	Population.
Dexter.....	Penobscot.....	7	3,530
Dixfield.....	Oxford.....	2	1,056
Dixmont.....	Penobscot.....	1	757
Dover.....	Piscataquis.....	5	2,091
Dresden.....	Lincoln.....	1	815
Durham.....	Androscoggin.....	3	1,625
Eagle Lake.....	Aroostook.....	1	1,421
East Machias.....	Washington.....	2	1,392
East Millinocket.....	Penobscot.....	1	923
Easton.....	Aroostook.....	3	1,301
Eastport.....	Washington.....	8	4,961
Eddington.....	Penobscot.....	2	611
Eden.....	Hancock.....	6	4,441
Eliot.....	York.....	3	1,530
Ellsworth.....	Hancock.....	5	3,549
Enfield.....	Penobscot.....	3	970
Etna.....	Penobscot.....	2	523
Exeter.....	Penobscot.....	1	888
Fairfield.....	Somerset.....	3	4,435
Falmouth.....	Cumberland.....	3	1,488
Farmington.....	Franklin.....	5	3,210
Fort Fairfield.....	Aroostook.....	6	4,381
Fort Kent.....	Aroostook.....	4	3,710
Foxcroft.....	Piscataquis.....	3	1,867
Frankfort.....	Waldo.....	3	1,157
Franklin.....	Hancock.....	2	1,161
Freedom.....	Waldo.....	4	480
Freeport.....	Cumberland.....	4	2,460
Friendship.....	Knox.....	2	776
Fryeburg.....	Oxford.....	6	1,282
Gardiner.....	Kennebec.....	8	5,311
Garland.....	Penobscot.....	2	817
Gilead.....	Oxford.....	2	233
Gorham.....	Cumberland.....	6	2,822
Gouldsboro.....	Hancock.....	2	1,349
Gray.....	Cumberland.....	5	1,270
Greene.....	Androscoggin.....	2	773
Greenbush.....	Penobscot.....	1	485
Greenville.....	Piscataquis.....	2	1,474
Greenwood.....	Oxford.....	2	664
Guilford.....	Piscataquis.....	3	1,680
Hallowell.....	Kennebec.....	4	2,864
Hampden.....	Penobscot.....	4	2,380
Hancock.....	Hancock.....	4	843
Harmony.....	Somerset.....	3	730
Harrington.....	Washington.....	3	1,020
Harrison.....	Cumberland.....	4	967
Hartford.....	Oxford.....	3	592
Hartland.....	Somerset.....	2	1,176
Hebron.....	Oxford.....	2	603
Hermon.....	Penobscot.....	3	1,210
Hiram.....	Oxford.....	4	945
Holden.....	Penobscot.....	2	609
Hollis.....	York.....	3	1,284
Houlton.....	Aroostook.....	6	5,845
Howland.....	Penobscot.....	2	494
Hudson.....	Penobscot.....	2	403
Industry.....	Franklin.....	1	465
Island Falls.....	Aroostook.....	4	1,686
Islesboro.....	Waldo.....	1	877
Jay.....	Franklin.....	2	2,987
Jefferson.....	Lincoln.....	1	1,030
Jonesboro.....	Washington.....	1	519
Jonesport.....	Washington.....	3	2,074
Kenduskeag.....	Penobscot.....	2	481
Kennebunk.....	York.....	4	3,099
Kennebunkport.....	York.....	3	2,130
Kingfield.....	Franklin.....	2	927
Kingman.....	Penobscot.....	2	741
Kittery.....	York.....	5	3,533
Lamoine.....	Hancock.....	3	482

CITIES AND TOWNS VISITED AND INSPECTED, 1916.

CITY OR TOWN.	COUNTY.	Number Times Inspected.	Population.
Lebanon.....	York.....	2	1,316
Leeds.....	Androscoggin.....	2	990
Levant.....	Penobscot.....	1	707
Lewiston.....	Androscoggin.....	21	26,247
Liberty.....	Waldo.....	1	650
Limerick.....	York.....	1	965
Limestone.....	Aroostook.....	2	1,293
Limington.....	York.....	1	980
Lincoln.....	Penobscot.....	5	1,988
Lincolnville.....	Waldo.....	1	1,020
Lisbon.....	Androscoggin.....	8	4,116
Livermore Falls.....	Androscoggin.....	4	1,100
Lovell.....	Oxford.....	1	668
Lowell.....	Penobscot.....	1	259
Lubec.....	Washington.....	2	3,363
Ludlow.....	Aroostook.....	1	412
Machias.....	Washington.....	5	2,089
Machiasport.....	Washington.....	2	1,318
Madawaska.....	Aroostook.....	1	1,831
Madison.....	Somerset.....	8	3,379
Mapleton.....	Aroostook.....	2	1,120
Mars Hill.....	Aroostook.....	4	1,511
Masardis.....	Aroostook.....	2	650
Mattawamkeag.....	Penobscot.....	1	517
Mechanic Falls.....	Androscoggin.....	5	1,678
Medford.....	Piscataquis.....	1	262
Mexico.....	Oxford.....	2	2,065
Milford.....	Penobscot.....	1	967
Milbridge.....	Washington.....	2	1,550
Millinocket.....	Penobscot.....	5	3,368
Milo.....	Piscataquis.....	9	2,556
Minot.....	Androscoggin.....	1	786
Monmouth.....	Kennebec.....	5	1,386
Monson.....	Piscataquis.....	3	1,243
Monticello.....	Aroostook.....	3	1,297
Mount Desert.....	Hancock.....	2	1,569
Naples.....	Cumberland.....	2	736
New Gloucester.....	Cumberland.....	3	1,228
Newburg.....	Penobscot.....	1	694
Newcastle.....	Lincoln.....	3	1,066
Newport.....	Penobscot.....	5	1,747
Nobleborough.....	Lincoln.....	1	775
Norridgewock.....	Somerset.....	5	1,608
North Berwick.....	York.....	4	1,777
North Haven.....	Knox.....	2	535
Northport.....	Waldo.....	1	518
North Yarmouth.....	Cumberland.....	1	686
Norway.....	Oxford.....	5	3,002
Oakfield.....	Aroostook.....	2	928
Oakland.....	Kennebec.....	7	2,257
Old Orchard.....	York.....	3	961
Old Town.....	Penobscot.....	7	6,317
Orland.....	Hancock.....	5	1,224
Orono.....	Penobscot.....	9	3,555
Oxford.....	Oxford.....	3	1,221
Palermo.....	Waldo.....	1	690
Palmyra.....	Somerset.....	1	960
Paris.....	Oxford.....	5	3,436
Parsonsfeld.....	York.....	4	1,057
Passadumkeag.....	Penobscot.....	1	445
Patten.....	Penobscot.....	5	1,406
Pembroke.....	Washington.....	4	1,091
Perry.....	Washington.....	2	1,153
Peru.....	Oxford.....	1	746
Phillips.....	Franklin.....	3	1,423
Pittsfield.....	Somerset.....	7	2,891
Poland.....	Androscoggin.....	3	1,382
Portage.....	Aroostook.....	1	500
Porter.....	Oxford.....	2	864
Portland.....	Cumberland.....	43	58,571
Pownal.....	Cumberland.....	1	625
Presque Isle.....	Aroostook.....	5	5,179

CITIES AND TOWNS VISITED AND INSPECTED, 1916.

CITY OR TOWN.	COUNTY.	Number Times Inspected.	Population.
Princeton.....	Washington.....	4	1,091
Prospect.....	Waldo.....	1	597
Randolph.....	Kennebec.....	2	1,017
Rangeley.....	Franklin.....	3	1,154
Ravmond.....	Cumberland.....	1	677
Readfield.....	Kennebec.....	2	906
Richmond.....	Sagadahoc.....	6	1,858
Ripley.....	Somerset.....	3	434
Robbinston.....	Washington.....	2	691
Rockland.....	Knox.....	15	8,174
Rockport.....	Knox.....	3	2,022
Rome.....	Kennebec.....	1	584
Roxbury.....	Oxford.....	1	311
Rumford.....	Oxford.....	9	6,777
Saco.....	York.....	8	6,583
Sanford.....	York.....	6	9,049
Sangerville.....	Piscataquis.....	3	1,319
Scarboro.....	Cumberland.....	8	1,945
Searsmont.....	Waldo.....	2	828
Searsport.....	Waldo.....	4	1,444
Sebago.....	Cumberland.....	2	536
Sedgwick.....	Hancock.....	2	909
Sherman.....	Aroostook.....	4	1,053
Shirley.....	Piscataquis.....	1	344
Skowhegan.....	Somerset.....	7	5,341
Smyrna.....	Aroostook.....	1	411
Solon.....	Somerset.....	3	1,034
South Berwick.....	York.....	2	2,935
Southwest Harbor.....	Hancock.....	1	888
South Portland.....	Cumberland.....	9	7,471
Standish.....	Cumberland.....	6	1,637
Stockholm.....	Aroostook.....	3	715
Sullivan.....	Hancock.....	3	1,132
Sumner.....	Oxford.....	2	762
Thomaston.....	Knox.....	7	2,204
Thordike.....	Waldo.....	3	525
Topsham.....	Sagadahoc.....	5	2,016
Tremont.....	Hancock.....	3	1,116
Trenton.....	Hancock.....	1	354
Turner.....	Androscoggin.....	4	1,708
Union.....	Knox.....	5	1,233
Unity.....	Waldo.....	3	899
Vanceboro.....	Washington.....	2	623
Van Buren.....	Aroostook.....	3	3,065
Vassalboro.....	Kennebec.....	5	2,077
Veazie.....	Penobscot.....	2	577
Vinalhaven.....	Knox.....	5	2,334
Waldoboro.....	Lincoln.....	4	2,656
Washburn.....	Aroostook.....	3	1,583
Warren.....	Knox.....	2	1,812
Washington.....	Knox.....	1	814
Waterboro.....	York.....	2	997
Waterville.....	Kennebec.....	22	11,458
Waterford.....	Oxford.....	2	934
Webster.....	Androscoggin.....	5	1,313
Wells.....	York.....	5	1,908
Westbrook.....	Cumberland.....	9	8,281
Westfield.....	Aroostook.....	2	689
West Gardiner.....	Kennebec.....	2	629
Whitefield.....	Lincoln.....	3	1,056
Wilton.....	Franklin.....	4	2,143
Windham.....	Cumberland.....	6	1,954
Windsor.....	Kennebec.....	2	706
Winn.....	Penobscot.....	2	655
Winslow.....	Kennebec.....	6	2,709
Winterport.....	Waldo.....	2	386
Winthrop.....	Kennebec.....	7	2,114
Wiscasset.....	Lincoln.....	3	1,287
Woodland.....	Aroostook.....	3	1,161
Woodstock.....	Oxford.....	2	808
Yarmouth.....	Cumberland.....	5	2,358
York.....	York.....	3	2,802
Total population of cities and towns inspected.....			632,125
Different cities and towns visited.....			286

In addition to this special inspection work, it has always been the custom of the Bureau—in the enforcement of the laws—to maintain a regular inspection in the larger cities of the state, where this seems necessary owing to the cosmopolitan population and the continual change of ownership in some of the establishments; also, owing to the advent of new industries from time to time.

Inasmuch as the reports of analyses for all samples forwarded to the Experiment Station are printed in the form of official inspections, it seems unnecessary for me to do more than refer to the number of the official inspections—in making this report—where such detailed information has been given.

It is very encouraging to report, that, in general, wherever we have given information concerning the requirements of the law, we have been met by a reciprocating attitude on the part of the dealers, and some very wonderful results have been obtained in connection with the enforcement of the net weight law and the establishment of better protection for food—all tending toward superior food sanitation.

SEED INSPECTION.

Two inspectors, employed especially for the purpose, were detailed to cover the state and make inspections of agricultural seeds during the season of 1916, and the inspectors in the department who were charged with other particular work were also given instructions to be on the lookout for infractions of the law with regard to agricultural seed; in this manner rather a complete inspection has been maintained. A greater number of samples has been taken than ever before, as will be noticed from the following figures:

Number of towns inspected	109
Number of dealers visited	339
Number of samples taken	469
Number of hearings arranged	13

During the latter part of the season, an automobile was employed and the opportunity thus given to visit dealers who are located away from the railroads and in remote parts of the state hitherto inaccessible. These visits were conducted along

educational lines as much as possible, and our instructions and advice were invariably welcomed. Our regulations were explained in connection with marking containers with the per cent of purity for all seeds offered for sale; as in years past, these regulations seemed to be well understood regarding the sale of timothy, redtop and clover, but an uncertainty existed in the minds of many as to the requirements pertaining to the sale of seed oats, barley and corn which, according to statute, are included among those varieties which must bear the per cent of purity.

Although the number of samples secured has been larger than ever before, the number of deficient samples has been much less in proportion; in fact, some of these deficiencies have been so slight that they have seemed to warrant overlooking entirely, and it is particularly pleasing to report that where 82 cases necessitated hearings in the year 1915, only 13 hearings have been deemed necessary in 1916.

The results of the analyses of seed samples will be found in Official Inspections now in the hands of the printer.

FEEDING STUFFS INSPECTION.

The feeding stuffs inspection for 1916 has been carried on quite actively throughout the year, with the exception of those months—from June to October—when there are but few new feeds on the market.

As usual, the inspector has been on the lookout for unregistered brands. When an unregistered brand has been reported to the Bureau, the matter has been taken up at once with the dealer and manufacturer. In nearly every instance these matters pertaining to the registration of feeding stuffs have been adjusted without the necessity of formal hearings.

The following table will give some idea of the scope of this particular class of inspection work:

Number of brands registered	532
Number of towns inspected	72
Number of samples drawn	324
Number of hearings arranged as a result of finding deficient samples	17

In addition to the work accomplished by the inspector, we have received numerous dealers' samples—especially samples of cottonseed meals—in accordance with directions issued from this Bureau. In order to emphasize this phase of the work, and to bring to the attention of the dealers the proper method to adopt if they would avail themselves of the coöperation of this department in the matter of free analysis of samples, the following circular letter has been sent to the various feed dealers in the state; this letter was accompanied by blank forms for describing feeding stuffs samples, and a notice that a supply of these forms may be secured from us at any time, upon request.

AUGUSTA, MAINE.

"Gentlemen:

"For a year or more it has been brought to our attention at various times by inspectors of the department, or through investigations at the laboratory, that shipments of misbranded and adulterated cottonseed meal are being received in this state, in that the labels for such products are not in agreement with the guaranty as to the protein content. Investigation and advice from good authorities have shown us that a considerable amount of this misbranded meal is made from delinted cottonseed, this practice of delinting having become more general recently, inasmuch as the lint now commands high prices for munitions; and it has unfortunately been determined that some of the manufacturers have continued to use old labels regardless of the changed protein content—the result of the practice above stated.

"Several cases brought to our attention and constituting violations, have been recommended to the federal department for prosecution and are now in process of preparation by the Department of Justice.

"I wish to call your attention to section 22, chapter 36, of the laws regulating the sale of commercial feeding stuffs, foods, etc., which states:

"No person shall be prosecuted under the provisions of the preceding sections of this chapter when he can establish proof of purchase, and a guaranty signed by the person residing in the United States, from whom the purchase was made, to the

effect that the article in question is not adulterated or misbranded within the meaning hereof.'

"It is to be understood that brokers and retail dealers, other than manufacturers, can secure protection from prosecution by requiring manufacturers to give written guaranties to the effect that no adulteration or misbranding exists in the product supplied.

"I also wish to call your attention to a ruling of the department whereby a sample of feeding stuffs, if taken according to directions as outlined by the chief executive of the law, will be analyzed and, if found to be not in accord with the guaranty, a complete report of the analysis will be sent to the dealer submitting the sample.

"I trust you will avail yourselves of both opportunities offered for your protection, and to this end we pledge our coöperation."

Another feature which adds greatly to the efficiency of the inspection work is the coöperation with the federal department in the enforcement of the food law, which embraces in its scope products intended for food for animals as well as for human consumption; under these provisions, it has been possible—when a sample of feeding stuff has been found deficient—for the deputy who drew the sample to secure documentary evidence proving interstate shipment of the goods in question.

The results of the analyses of feeding stuffs samples will be found in Official Inspections No. 79.

FERTILIZER INSPECTION.

The fertilizer inspection was begun early in the spring months by sending out the regular inspectors; there were also special inspectors employed for this work. As last year, the samples have been obtained, not only from storehouses and agents, but from goods in the hands of individuals. Each sample has been marked by the inspector's number and sent to the laboratory and, not until the report of analysis has been received at this office, has any information relative to the name of the brand, the manufacturers, the guaranteed analysis, or from whom the sample had been obtained, been communicated to the Experiment Station.

Another feature, already spoken of, which marked the fertilizer inspection for the year 1916, was the explicit directions given to the inspectors for drawing a sample fertilizer, as follows:

"Select one package from the lot to be sampled and observe carefully the markings upon it, noting the brand, the name of the manufacturer, the town and the date—that is—the day and time of day that the sampling took place. The guaranty should also be observed and the amount of nitrogen, available phosphoric acid and potash reported, taking particular pains to copy exactly this information given on the outside of the package; then, wherever facilities are found, the package to be sampled should be weighed. The information thus gathered from the label on the package should be written down and assigned an index number.

"In sampling a barrel, an auger should be used for boring a hole, boring as near the center of the head as possible, through which the sampling tube can be inserted.

"In sampling from bags, it will not be necessary to untie the bags, but simply loosen the lacings or—perhaps without doing this—force the tube between the lacings in the top of the bag.

"The sample should be drawn from *one* package, only.

"It will be found of advantage to place the package to be sampled in a horizontal position. Close the tube; insert the tube in the package; open the tube, allowing the fertilizer to fill it, possibly assisting this operation by a slight motion of the tube; close the tube and draw from the package, emptying the contents upon a strip of clean oil cloth; repeat this process at least three times, varying the position of the tube so that different parts of the package may be reached each time, then thoroughly mix the portions drawn from the different parts of the package until a fair composite sample has been obtained. Put the mixture into a jar; screw the cap on tightly; apply the sticker furnished for the purpose, bearing an index number similar to the number on the slip descriptive of the sample and including the information copied from the label."

The results of following the above method of sampling have shown no greater number of deficient samples than were found last year, when the samples for analysis were obtained as composite samples made up from portions drawn from several packages:

Number of brands registered	291
Number of towns inspected	73
Number of samples drawn	621
Number of hearings arranged	25

A misunderstanding seemed to exist during the first of the year—in the case of some manufacturers—regarding the registration of brands that had been carried over from the previous season. In the case of one company, eleven brands of this nature were discovered; as the result of a hearing, these goods were all registered.

As a result of the analysis of a sample of fertilizer known as Bone, Blood and Potash, manufactured by the Tuscarora Fertilizer Company and submitted to this department by Ellis Logan of Houlton—which case was reported in detail in the 1915 report—a matter of considerable importance developed. The case was brought to trial in the April term of the supreme judicial court of Aroostook County, at which time the fertilizer company sought to recover for the price of the fertilizer, while Mr. Logan's defense was framed on the grounds that the fertilizer in question was not up to the affixed guaranty on the package. Witnesses from the department were summoned by both the plaintiffs and defendant, and the case was regarded with state-wide interest. It is understood that it has recently been argued before the law court where it was carried upon report.

A case against the American Agricultural Chemical Company, and one of similar nature against the Lowell Fertilizer Company, were brought to our attention. Hearings were arranged, and a settlement satisfactory to the department obtained.

Again this year, as last, as a result of the provisions outlined in chapter 36, sections 16, 17, 18, Revised Statutes of 1916, authorizing the free analysis of a sample of fertilizer if taken in accordance with the requirements of this department by a correspondent, various samples were received at this Bureau, and a report is submitted regarding a sample of fertilizer received from J. F. Guiou of Presque Isle: The requirements having been observed, the sample was forwarded to the experiment station for analysis; when the report was returned to Mr. Guiou, it was learned that the sample was obtained from M. E.

Melville of Presque Isle and was a portion of Lowell Fertilizer Company's brand known as Lowell Potato Grower Four-Eight-Four, with a guaranty of 3.28 per cent to 4.10 per cent nitrogen; 8.00 per cent to 9.00 per cent available phosphoric acid; four per cent to five per cent potash. The report of analysis showed 2.95 per cent nitrogen; 7.84 per cent available phosphoric acid; 3.28 per cent potash.

A hearing was immediately arranged with the Lowell Fertilizer Company, and this hearing was followed by other interviews between the sales manager of the fertilizer company and this department; a fine of \$50 was at last imposed, which fine was paid. One fact, quite interesting to note in connection with this affair, was that—at the request of the fertilizer company—a portion of the sample was returned to them for analysis, and the sales manager stated at the hearing that the report of their chemist agreed essentially with the report made by the experiment station at Orono, the only variation being a slight difference in the phosphoric acid content.

In general, the marked deficiency in all samples—where any variation has occurred—has been a shortage of available phosphoric acid. Even though the amount of total phosphoric acid has been maintained, in nearly every case where a sample has fallen down, it has been in available phosphoric acid. As a result of these findings, all the companies selling goods of this nature have been notified and, in most cases, they have been very prompt with their explanations. At the present time, there are a few cases remaining unsettled.

The results of the analyses of fertilizer samples will be found in Official Inspection No. 80.

FUNGICIDES AND INSECTICIDES INSPECTION.

As reported last year, there has been a clearer understanding between the manufacturers of fungicides and insecticides and the Bureau of Inspection as to the adjustment of registrations, although through the year we have received occasionally the statement from some correspondent to the effect that the law is not constitutional. It is gratifying to report that we have had less difficulty in arranging the registrations than ever before.

The work of inspection covered about two months, and was carried on for the purpose of determining what goods, if any, were being sold illegally, and to collect such samples as were deemed necessary to gather an index on the quality of the fungicides and insecticides sold. The variety of samples collected include those substances most generally used for the extermination of insect pests infesting animals and vegetation, with particular reference to arsenical poisons.

A great many more manufacturers than in previous years have—in making their manufacturers' certificates—given a complete list of ingredients, thus enabling this Bureau to judge more definitely in regard to the nature of the preparation, and to give the applicants the benefit of free registration whenever possible.

In regard to the quality of the goods sampled, not one was reported to be below guaranty.

Number of brands registered	249
Towns inspected	57
Samples collected	42

The inspector's tour of inspection revealed the fact that many products were being sold illegally in that registration had not been effected. The dealers and manufacturers were at once notified and the goods were either properly legalized by registration, or withdrawn from sale.

As a result of observations made in connection with this class of inspection work, the suggestion is made that, along with the analysis of samples collected, some work be done—either in the department or at the experiment station—in the way of determining the actual value of the fungicides and insecticides by practical application.

The results of the analyses of fungicides and insecticides collected in 1916 have not as yet been published in Official Inspections.

DRUG INSPECTION.

While the work of drug inspection has been accomplished largely by one inspector who was assigned that particular line of investigation, the general inspectors were also instructed not to neglect the inspection of drug stores, especially those where soda fountains are operated. The work was conducted along

educational methods and, with this end in view, the cleanliness of glasses and other utensils, the source of syrup, the general sanitation of soda fountains, and all matters pertaining to general sanitation, have been carefully noted. In many of the drug stores, country stores, and other places where soda fountains have been found in operation, sanitary paper drinking cups and ice cream dishes have been installed.

Not a large number of drug samples have been collected during the past season, but in nearly every instance the samples collected and analyzed have been found to agree essentially with the pharmacopoeia requirements.

FOOD INSPECTION.

An attempt has been made to have education the predominating feature in the food sanitation and food inspection work. An abundance of work has been found, owing to the installation of new stores—particularly among the foreign element of our larger cities. It has been very gratifying to note that numerous dealers whom we have visited have placed glass in their windows and acquired modern equipment insuring a dust-proof covering for their food; this action has been taken by the dealers as a result of recommendations made by the inspectors when consulting with them along the lines of perfect food sanitation, and the subject of protecting their products from dust and other contamination is being considered more and more by the dealers, themselves, as an economical problem.

Early in the year, a report that horse meat was being sold in one of the cities of our state, was given our attention. A careful investigation was made, samples of the suspected product obtained and analyzed and, as a result of our findings, a report was made to the complainant that—from the best information obtainable—the product in question was not horse flesh, but an inferior grade of beef. The firm suspected of selling this product, however, has been under surveillance during the whole year, but no violations have been detected.

One particularly flagrant case—brought to our attention by an inspector—which was carried forward to final prosecution, was the slaughter and sale of a sick cow. The animal had been sold by the original owner with the idea that the hide would be of

value and the carcass go into fertilizer tankage; however, the dealer making the purchase disregarded the diseased condition of the animal, sold her to a slaughter house where she was killed and—to all appearances—when detected the meat was on the way to the consumer. As already stated, this case has been prosecuted, and a case of very similar nature is now pending.

Number of miscellaneous samples taken....	517
Number of towns inspected	182
Number of hearings arranged	67

Grocery Stores and Markets: In carrying on the inspection of grocery stores and markets we have, as usual, dealt with the proper labeling of lard, molasses, sausages and vinegars—if sold in substitution for the standard article. The general habits of the dealers in regard to the wrapping of bread, and other articles, and the protection afforded food products of all kinds, have been under observation.

The attempt has been made to lay considerable emphasis—especially at the holiday season—upon the condition of dressed poultry, and the inspectors have made as extensive a distribution of the rules and regulations, promulgated by this Bureau regarding the subject, as possible.

Clams and Oysters: Ever since the inauguration of the pure food law, the subject of regulating the sale of oysters, clams and scallops has demanded considerable attention and, during the last season, rather an unusual effort has been made to remedy the conditions as evidenced by the tabulations reporting the analysis of the samples collected, employing the usual methods of education, moral suasion and, finally—in a few instances—prosecution.

Generally speaking, the oyster situation is greatly improved, and in only a very few instances has it been noted that scallops were being sold in serious violation of the law; but in the sale of clams we have detected numerous cases of adulteration, and it is greatly to be regretted that the sale of this commodity seems extremely hard to regulate. The statute employed for such regulation is found in section 12 of the Revised Statutes and reads:

“For the purpose of this chapter an article shall be deemed to be adulterated, in the case of food, if any substance has been

mixed and packed with it so as to reduce or lower or injuriously affect its quality and strength."

It is generally well known by clam diggers and dealers that if clams are allowed to remain—if only for a few hours—in fresh water, they will become considerably swollen and their quality impaired, as soaking clams—as well as oysters—in fresh water makes them plumper and larger, increases them in weight and size and, therefore, the profits of the dealer, but does not add to the value as a food product; and at their best, without adulteration, clams as a nourishing food cannot be considered of any very great importance and should be regarded as a condimental substance. The principle of this process of floating or soaking is, that a soft substance like a clam, having in its composition a mineral salt, when brought in contact with fresh water brings about a process of diffusion whereby water passes through the cell walls, enters the cells of the clam, and the mineral substance is forced out; consequently, the increased weight and size by the addition of water at the expense of the natural flavor. By the laboratory methods of analysis, it is not at all difficult to ascertain whether or not clams have been soaked, and clams opened under proper conditions, washed but not soaked, show an analysis of free liquids not more than ten per cent, and total solids not less than 18 per cent. A typical example of an analysis for a sample purchased at a Portland market, properly shucked and washed without soaking, showed free liquids 6.45 per cent, and total solids 21.76 per cent.

During the past season, as soon as a general sampling of clams was commenced and the reports of analyses returned, it became apparent that the method of dispensing clams needed more thorough investigation, and an attempt was made to determine the source of such supply and from what source this food product was being supplied in its greatest quantity. An attempt was also made to visit and inspect the premises of the wholesale dealers and definitely determine their methods of shucking and preparing their product for market. As a result, a very good idea of the proportions of the clam industry in this state—and the statistics concerning it—has been gathered. It was found that during the past winter, from Pine Point, in the town of Scarboro, aside from the clams that were dug in that vicinity, approximately 5,000 barrels of clams in the shell were received

from points east, covering a territory as far as Saint Andrews, N. B. These clams, when received in Pine Point, were shucked by the dealers there and shipped to both intra and interstate points, and the examination of the freight records shows that the cities of Boston, Lowell, Worcester, Lawrence and Lynn, in Massachusetts, Manchester, New Hampshire, and Providence, Rhode Island, were supplied extensively by dealers in this place. It was also learned that the cities of the Kennebec Valley in the State of Maine, and other cities of the state, were being supplied from this source; also, that clams were being supplied in considerable quantity from Sorrento, Chebeague and other islands in Portland Harbor, through the wholesalers in Portland, and in small quantities from the vicinity of Popham, Bay Point, Friendship and Medomak.

In the course of inspection, a few cases have been reported where the dealers, in direct violation of the food standards, have been found offering clams for sale, with a piece of ice in the container and in direct contact with the clams; in all instances, the offenders have been cited to hearings and the cases settled; cases of this nature, however, have not been frequent, and early in the investigation it was definitely decided that the retailers were not wholly to blame and that evidently the clams were being adulterated in the hands of the wholesalers. Accordingly, charges were brought against wholesale dealers, not only as a result of the analysis of samples obtained from their places of business, and actual observation of their methods, but for violations based upon the analysis of other samples taken from retailers who had been supplied by these wholesale dealers and to which sources the deficient samples were traced. As a result, two large wholesale concerns were fined for such violations. Later sampling of their product in the early autumn showed that considerable benefit had resulted from such action, as these later samples were found to be of a superior quality and in accord with the food standards. A third concern, doing a wholesale business, was taken to court and a fine with costs imposed, which was appealed. This case was brought in the Portland municipal court and appealed to the May term of the superior court, but, on account of a misunderstanding, was not pressed by the county attorney at that time. Later examination

of the product of this concern revealed that their method of doing business had been changed and that the product was also in accord with the food standards.

With the possibilities for adulteration, the regulation of the sale of this commodity—even though a small item of our food supply—seems a subject worthy of consideration in order that the public may be safeguarded. It is earnestly hoped that the conditions which have been brought to our attention by this investigation during the past season may be permanently remedied.

The general results of the analyses for these samples of clams and oysters have been published in Official Inspections No. 78, together with the standards governing the sale of shellfish, for the information of the public.

Restaurants: The inspection of hotels, lunch rooms, restaurants, lunch carts, and every place where food has been offered for sale, has been carried on as fully as possible with the funds appropriated and the force of inspectors employed.

Bakeries: With the increased cost of material and the changed conditions everywhere, the regulation of bakery products seems to be a delicate question at present. It is, however, a satisfaction to report that wherever recommendations have been made for producing a better product, or that greater care should be taken in handling the finished product, such recommendations have been gratefully received and the advice heeded; although there is, of course, still chance for improvement.

Ice Cream: Contrary to the custom of previous years, ice cream samples were not collected as generally over the state; we did attempt, however, to cover new territory, and the results were most gratifying, inasmuch as practically all the samples taken showed the ice cream to be of good quality and essentially up to the standard.

The data reporting such samples are now in the hands of the printer, and will be issued in the usual Official Inspections.

Bottling Establishments: The general work of inspection of establishments where carbonated beverages or bottled sodas are manufactured, has been carried on principally with regard to the matter of sanitation. But little has been done with reference to the analytical side of this branch of the work.

Food Factories: As well as turning our attention to bakeries, slaughter houses and bottling establishments, a special endeavor has been made during the past year to make our inspection of food factories as complete as possible—with particular reference to the three principal canning industries of our state, namely: Corn factories, blueberry factories and sardine factories. The following tabulations will show the unique importance of the sardine industry in Maine as compared with the rest of the United States; they also compare the blueberry pack in Maine with that of the rest of the country, and define the position the state occupies in the clam canning and corn canning industries:

Total number of cases of sardines packed in the	
United States in 1914.....	5,012,199
Total number of cases of sardines packed in the	
State of Maine in 1914.....	4,634,424
Total number of cases of blueberries packed in the	
United States in 1914.....	151,636
Total number of cases of blueberries packed in the	
State of Maine in 1914.....	116,001
Total number of cases of clams packed in the United	
States in 1914	185,186
Total number of cases of clams packed in the State	
of Maine in 1914	94,813
Total number of cases of clam chowder packed in the	
United States in 1914	102,838
Total number of cases of clam chowder packed in the	
State of Maine in 1914.....	86,771

While not leading in the production and packing of corn, it is unnecessary to state that the quality of the Maine product makes up for the inability to show championship figures for production; we are, however, nearly at the top of the list, with a pack of 1,101,333 cases.

Corn Canning Factories: With the aid of an automobile—the property of the Department of Agriculture—and through the fortunate coöperation of the federal inspector, detailed by the Bureau of Chemistry to accompany the state inspector, it was possible to make a more complete inspection of the corn canning factories of the State of Maine than ever before. In other years it has been particularly arduous to reach many of these

concerns, owing to their isolation and distance from the railroads; but by the use of the automobile, this difficulty has been overcome. The coöperation of the Deputy Sealer of Weights and Measures was also obtained, and he accompanied the federal and state inspectors on these trips; in this way, while information was gained as to general sanitary conditions and the raw product used, the scales and measures employed by the packers were tested. Our deputy gave careful attention to the methods employed in packing, noting the source of the water supply, the health and cleanliness of the employees, etc. Some of the factories did not have proper washing and drinking facilities, nor were soap and towels supplied; other establishments, however, had sanitary notices posted, and where their use was not in evidence, it was recommended. The use of corn-starch was investigated; samples from practically all of the factories were obtained and have been examined at the laboratory. Thus far, the results have been most pleasing and indicate that wherever corn-starch has been added, the fact has been stated upon the label. We are glad to make the general assertion that the average corn packer in the State of Maine is attempting to put upon the market an excellent product—worthy of the enviable reputation which Maine packed corn bears.

Blueberry Factories: In two counties in the state—Washington and Hancock—the canning of blueberries has become an important industrial operation and realizing its importance, we have devoted some time during the past season to the inspection of this industry. From about the 20th of July until the 20th of September, when the season for canning blueberries is at its height, an inspector was assigned to this particular work; he visited sixteen factories, advising with the packers and calling to their attention the rules and regulations of this Bureau providing that factories shall be kept clean and free from dust and cobwebs; the floors kept clean; the utensils used in the process of canning cared for in a sanitary manner; the toilets kept in a cleanly condition, and soap and a supply of clean towels always accessible. It was also a regulation that particular care should be taken with the berries before canning, in order that all foreign substances might be removed—and upon the enforcement of this regulation rested the greatest responsibility. The inspector detailed for this work devoted his whole time to the

blueberry industry and was thus able to devote a part of every day to some one of the packers for a few hours at least. The result of this inspection work has been most encouraging.

At about the height of the season—the middle of August—the writer accompanied the chemist of the National Canners' Association—W. D. Bigelow of Washington, D. C.—on a tour of inspection, visiting practically all of the blueberry canning establishments in operation. We were glad to note the willingness of the canners to accept the recommendations made by the inspector, and their avowed intention to comply with the regulations, with the idea of the betterment of their product. In many cases we found additional help had been put on for the express purpose of picking the berries cleaner than they have ever done before, and this will go a long way toward the general improvement of their product. This seems to be the only way of insuring clean berries, as no system of winnowing has yet been devised that will produce berries absolutely clean from sticks, leaves and other foreign substances, in preparation for canning. During the busy season—particularly on the old burns—that is, barrens where it will be necessary to burn the following season—the fruit is gathered by raking. The implement used for this purpose is very similar to a cranberry rake, resembling a dust-pan, with the bottom composed of stiff, parallel wire rods. The berries may be gathered much more quickly and cheaply by this means, but by the use of the rake the fruit is considerably mixed with leaves, sticks, chokeberries, bunchberries and other foreign substances. Before being crated for transportation to the factory, they are passed through a fanning mill and then, again, at the factory are submitted to another winnowing, but this is not all that is necessary to insure a clean, attractive product; an individual picking is necessary and, to this end, the regulations requiring particular care with this specific branch of the work have been recommended.

The possibilities of the industry are wonderful, and the figures previously given will show the unique qualifications of the industry to Maine as compared with any other section of the United States. Growing, as they do, on land that is practically unfit for any other purpose, they furnish employment to the inhabitants and are a source of revenue for the whole community. As yet, there has been practically no attempt made to

place on the market any other product than the unsweetened fruit, but it is believed that by using syrup or sugar, a greater demand will be created for the product and a much larger profit realized.

Sardine Factories: This industry, which means a great deal to the State of Maine, and regarding which we made rather a comprehensive report last year, has come in for its share of attention in the inspection work of the past season.

We have fortunately secured the coöperation of the United States Department for our investigations, and have also welcomed the inauguration of rather an elaborate system of inspection by the National Cannery Association, financed by the packers themselves, which—on the whole—has been productive of wonderful results.

Early in the season an informal conference was held with the director of the National Cannery Association, and rules and regulations satisfactory to the Association and this department were agreed upon. We feel sure that the results have been pleasing to all concerned.

A special investigation, during the early spring months, was made in regard to the habits and methods of the fishermen in securing the fish furnished the factories. This work was carried on in compliance with the regulations promulgated by the Cannery Association, to the effect that fish shall not be packed which have been seined and not confined in keeping pounds or allowed to remain in the seines for a sufficient time to rid themselves of the "red feed." The quality of the fish, in some instances, was ascertained by the inspectors intercepting the boats upon their arrival at the factories.

As stated last year, we did not attempt to make any recommendations for expensive equipment at the sardine factories, or suggest ideas too fastidious for fulfilment; but—aside from the proper selection of fish—our recommendations have been for convenient and cleanly toilets and dressing rooms, with a supply of soap and clean towels always available. We have strongly urged the discontinuance of the common drinking cup, although in some cases this advice has not been heeded.

At the beginning of the packing season, and also when the work of packing was well advanced, samples consisting of from five to ten units to a sample, and covering practically the whole

variety of the product of the factories, were obtained; these samples have been examined at the laboratory and the results have shown a cleanly and attractive product.

It is with considerable pleasure that the statement is made, that the coöperation of the state and federal departments, the excellent inspection which has begun with the National Canners' Association, together with the apparent willingness of the packers themselves, have gone a long way toward producing a product which can be placed on a parity with the Norwegian or French brands of sardines, and overcoming the prejudice which has existed against the Maine product.

Herring Industry: During the month of November, a tour of inspection by a state inspector, accompanied by an inspector from the Bureau of Chemistry, was made among the smoked and boneless herring industries around Eastport, Lubec and Machiasport. Particular attention was given to the health and cleanliness of the employees and a general index gained as to the character of the work, factory buildings, equipment and materials used; also, as to processes of manufacture and appearance of the finished product, as well as the disposition of waste materials. Wherever conditions were found existing which were not in accordance with our regulations, recommendations were made for improvement. We regret to state that in some instances the surroundings were not particularly sanitary and the facilities afforded for the comfort of the help were decidedly deficient. In some of the factories, the floors and benches were in poor condition. When it is considered that boneless herring are, in a great many instances, eaten without cooking or application of heat, or subjected to any sterilizing process—going direct to the consumer—it is very important that sanitary conditions should obtain in factories where this product is prepared. A further investigation of this industry will be undertaken during the coming season.

COÖPERATIVE WORK.

We have been aided greatly in our inspection work by the right of recommending prosecution to the federal department on account of authority given by the United States Department through the Collaborating State Officials Commission. It has

seemed that the work as begun by the office of the State Coöperative Food and Drug Commissioner—established in 1914—has become more and more active, and recommendations for federal prosecution have been made for numerous cases during the year.

We were particularly grateful for the assistance given us by the federal department in the investigation of the matter of shipping adulterated clams to interstate points. As soon as it became apparent that this practice was being followed, the matter was communicated to the federal authorities at the nearest laboratory—which is in Boston—and as a result the offending wholesalers were cited to a hearing, thus greatly strengthening the statute for our enforcement.

The coöperation of the Federal Bureau of Chemistry with our department, in delegating an inspector for three distinct tours of inspection—the investigation of sardine factories, corn canning factories and the smoked and boneless herring industry—was particularly welcome. The work was carried out with complete harmony, and it is felt that much good resulted from this combination of forces. Any requests for information from the Coöperative Department have always been attended to promptly, or referred to the proper authorities where such information might be obtained. The inauguration of reports of seizures and the receipt of seizure cards have been greatly appreciated; when these report cards have been received at this office—in order that the information thereon might be more generally disseminated—a circular letter has been written to the inspectors of the department, containing the data in a somewhat abbreviated form.

The letters sent to this Bureau relative to methods of food and drug analysis, have also been gratefully received.

FAIRS.

As usual, the inspectors of the department visited the principal fairs of the state and advised the purveyors of food at these places as to the requirements of the law and the most approved methods for dispensing food on such occasions. This is a difficult proposition to handle, but for the most part the intentions of the food vendors seem to be honest.

BULLETINS FOR DISTRIBUTION.

It seems pertinent to announce that more comprehensive information relative to samples of foods, drugs, feeding stuffs, fertilizers, fungicides and insecticides, is published in the form of Official Inspections and designated by index numbers. Pursuant to the statute, these Official Inspections are published by the director of the experiment station and contain the exact results of the samples submitted by the deputies of this department for analysis.

The list of the Official Inspections published by the director of the experiment station, and bulletins, reports and regulatory announcements concerning the rules and regulations emanating from this Bureau is given below :

Official Inspections No. 66—Opened Shell Fish

67—Cream and Milk

68—Fungicides and Insecticides

69—Cream and Milk

70—Vinegar

71—Cream and Milk

72—Feeding Stuffs

73—Seed

74—Fertilizer

75—Fungicides and Insecticides

76—Ice Cream

77—Flavoring Extracts and Spirits

79—Clams, Oysters, Scallops

80—Commercial Fertilizer

Bulletin No. 424—Drug Standards

425—Food Standards

Laws of Maine regulating the sale of :

Agricultural Seeds

Feeding Stuffs

Fertilizers

Drugs

Foods

Fungicides and Insecticides

Regulatory Announcement No. 125—Ice Cream
126—Protection of Foods
127—Net Weight
130—Shell Fish
135—Dressed Poultry

MEETINGS.

I have attended the following meetings, where I have spoken upon various subjects pertaining to certain phases of the enforcement of the pure food law:

On March 8, Farmers' Week at Orono; on June 28, the Maine Pharmaceutical Association at Augusta; August 7 to 11, the Association of Dairy, Food and Drug Officials at Detroit, Michigan; October 11 and 12, the New England Tri-State Master Bakers' Association at Portland.

In closing, I wish to take this opportunity to acknowledge your kindness and to thank you for the support given my efforts in the enforcement of the pure food law. I also wish to thank the various federal and state officials who have coöperated with me, and all others who have in any way aided me in carrying on the work of inspection during the year that has past.

Respectfully submitted,

A. M. G. SOULE,
Chief, Bureau of Inspection.

REPORT OF PROCEEDINGS
OF THE
STATE DAIRY CONFERENCE AND ANNUAL
MEETINGS
OF THE
MAINE DAIRYMEN'S ASSOCIATION
MAINE SEED IMPROVEMENT ASSOCIATION
AND
MAINE LIVE STOCK BREEDERS' ASSOCIATION
CITY HALL, AUGUSTA.
DECEMBER 4-8, 1916.

MONDAY EVENING, DECEMBER 4.

Meeting opened by Hon. William T. Guptill, Commissioner of Agriculture. Invocation by Rev. V. O. Anderson, Augusta.

ADDRESS OF WELCOME.

BLAINE S. VILES, Mayor of Augusta.

It is always a pleasure for the people of the Capital City to welcome those from beyond our borders and tonight, as Mayor of Augusta, it becomes my privilege to extend to you a most cordial greeting. We appreciate the honor conferred upon Augusta in having you here for this convention and we trust that you will return many times in future years for similar occasions

You come from all parts of the Pine Tree State; from far away Aroostook—that wonderful county of the north; from Oxford and Washington and York; from the fertile valleys of the Kennebec and Androscoggin and Penobscot, the representatives of great importance to the State of Maine—that grand old Commonwealth of the northeast which we love and in which we believe. No people are more loyal to their state than are the people of Maine and yet, it might be said (and perhaps with some truth) that we of the East do not boost for our state and for our home towns as do our brothers of the West; that we do not advertise our attractions among the people of the world, and, if we should be lacking in this advertising, it is because of the honest conservatism with which we are imbued.

No people, anywhere, have more to advertise than we—a state old, yet little developed, great in area with some 20,000,000 acres; today three-fourths of its territory is classified as forest land. A state of wonderful natural resources, wonderful forests of useful woods, great rivers with powers that when harnessed will form the backbone for unlimited industrial and consequent agricultural development; wonderful lakes and mountains and streams invite those in search of health and pleasure; a rugged seacoast offers safe harbors and beautiful sites for summer homes. Yes, our state is great in many ways, but above all else is she fortunate in her citizenship, sturdy, God-fearing, law-abiding people, breathing the sturdy honesty of old New England.

The sons of Maine have taken their places as leaders in all walks of life, in statesmanship, in business, in finance and in letters. We should boost for Maine always and we cannot over-estimate her many advantages and possibilities.

We people of Augusta are proud of our city. Augusta was richly endowed by nature and has been builded well by man. It is a clean town, conservative, yet steadily gaining. It has good schools, good homes and good civic improvements. You come at a time when the chill of approaching winter fills the air, but our welcome is warm. We trust your meetings will be successful and that you will return to your homes with kindly feelings toward Augusta and her people.

RESPONSE.

HERBERT M. TUCKER, Canton.

As President of the Maine Dairy Association, it seems to devolve upon me this year to respond to the address of welcome. In coming here tonight I do not represent wholly the Maine Dairymen's Association, but also its two lusty, full grown children, the Maine Seed Improvement Association and the Maine Live Stock Breeders' Association. We join each year in mutual meeting because we are of one family; we are working along different lines, but all are working for the good of Maine agriculture.

Now, it has been said that, when a person begins to look back to the past, he is growing old; but how can we, as a nation, as a state, as an association or as individuals, plan our course for the future if we do not occasionally stop and look back over the past? I well remember my boyhood days and the conditions as they existed at that time. I see a great many people before me tonight who can remember back a great deal farther than I, but conditions are such that I can perhaps remember thirty or thirty-five years ago and recall conditions at that time as well as any one of my age, from the simple fact that my father, being in very poor health, was obliged to draw me early into service and I became acquainted with the stern realities of life when quite young. I can well remember a morning—several months before I was fifteen years of age—when my father called me to him and said, "Bert, you are doing all the work that is being done on the farm, and it is no more than right that you should go ahead and do as you think best. Here is the family pocketbook; there isn't much in it, but all there is is yours, and now go ahead." From that time until now I have known what it means to support a family. I am speaking of the personal matters simply because these early recollections of

farm life are sharply engraven on my mind. I remember well the first cow I ever milked; I remember where she stood, how she looked and the first time she ever put her foot into a pail of milk. I remember the old barn; I remember the old tie-up on the north side of the barn and, as there were no boards in front of where the cows stood, I assure you there was plenty of fresh air in that tie-up, if no sunlight. I remember the old wooden stanchion and how it was our duty each night to go around and tap those wooden pins in order to make sure the cows were securely fastened. I remember the Santa Claus expression that those cows had on a frosty morning; I remember the barn cellar, all open on one side; the watering tub in the yard where we had to pump the water every morning. I remember how we used to strain and set the milk in the cool cellar in summer and how we used to keep it in the warm cupboard up stairs in the winter. I remember the old churn; the old butter mold with its sprig of daisies on top; the old red box in which we used to pack that butter to go to market, and the old gray horse—I certainly remember him; he was perfectly safe at one end, but I shall carry the marks of his teeth to the end of my life. I remember the old wagon on which we loaded that butter and other products; in winter, if I had good luck, I got twenty-five cents a pound for it, but as the days became warmer it got down to eighteen cents; then there would be no sale for it and mother had to go to making cheese; the process of this cheese-making is so vivid in my mind that I believe I could make cheese today.

We have made great progress since those days; there is no question about it. Probably the greatest improvement is taking butter-fat from the milk; the deep setting system took the place of the pans and the separator has taken the place of the deep setting system; but today, I am sorry to say, there are about as many tie-ups as cold as my father's. We did not know about bacteria content in those days, but I believe those cows of ours gave us as clean and as pure milk as a whole lot of the milk producers today. I firmly believe those cows I had as a boy were better producers than thousands of cows today, and hundreds of pounds of butter produced today are not as good as my mother used to make. So have we really, after all, made

the progress that we should? Now that is the question I would like to have every farmer take home and think on: Have we made the progress that we should?

Now, just a word in closing, in regard to the future. If you think we have not made the progress that we should, shall we be content to drift along and make just as little progress as we can, or shall we knuckle down and face the realities of farm life and make greater improvement? There are, I am glad to say, many things connected with this that are encouraging. There never was a time when the demand for pure bred live stock was so good as at the present time; live stock that not only has a pedigree for purity of blood, but a pedigree for production; stock we can put into our herd and improve it; stock we can breed on and lift the standard of Maine dairy cattle.

Now, I will say to the Maine Live Stock Breeders' Association: Keep the fire burning and keep the pot boiling. There never was a time when the farmers of Maine realized the importance of good seed as we do today. We want seed that has a pedigree and a history; seed that the farmers that raise them can say: "I know that seed is free from foreign seeds and weeds." Men of the Seed Improvement Association, keep that fire burning so bright, it may be seen from the four corners of the State of Maine.

As for the Maine Dairymen's Association; well, the time was when we were perfectly willing to pay any sum that the dealer might ask for any commodity that we bought; on the other hand, we accepted from the creameryman, the milk contractor or the merchant, whatever he was willing to put into the thing. I am thankful to say that conditions are changing; they have got to change. We deplore the high cost of living just as much as anybody possibly can, but the men in the big city today who are paying from ten to twelve cents a quart for milk do not want to think they are dropping that into the farmer's pocket, for they are not.

Before the Interstate Commerce Commission last winter the H. P. Hood Company testified, much against their will, but nevertheless, they testified, that after they had paid all their expenses, salaries, etc., a dividend of seven per cent was declared on their preferred stock, they declaring a dividend of

eight per cent on their common stock, and then there was a surplus of \$80,000 that they divided among their employees. Now, I want to ask you farmers who are producing milk for the Hood Company, did you get eight per cent out of your business after paying your expenses?

Now these things are what we are working for, along different lines, to be sure, but we are all working for Maine agriculture and these things are what have brought us to your city at this time, Mr. Mayor. We heartily appreciate all you have said, and we appreciate all that the Board of Trade has done to make our visit a success. We certainly think our stay will be pleasant and believe it will be profitable.

BUSINESS MEETING OF THE MAINE LIVE STOCK BREEDERS' ASSOCIATION.

In the absence of the president of the Association, Charles S. Pope, who had been taken suddenly ill, the seventh annual meeting of the Association was called to order, at 9 A. M., by A. H. Ellis, Treasurer, who requested Frank S. Adams, a former president, to preside. With Mr. Adams acting as chairman, the Association proceeded to business.

The records of the last annual meeting were read by the secretary and approved.

The reports of the secretary and treasurer were read and accepted.

Report of committee on advertising: Owing to the fact that little money was in the treasury, we think it is not wise to use any of it through the press, direct. To arouse interest among the farmers of the state, we advise that an invitation be sent to each subordinate grange in the state to send a representative to the meetings of the Maine Live Stock Breeders', Maine Dairymen's, and Maine Seed Improvement Associations, which was done. We also advised that the Commissioner of Agriculture give live stock interests more attention, especially by aid in exhibiting at the larger fairs of the country.

Respectfully submitted,

JOHN A. NESS,
H. M. TUCKER,
OWEN SMITH,

Committee.

Voted to accept the report.

The following committees were appointed by Chairman Adams: Committee on resolutions, L. C. Holston, Cornish; C. D. Woods, Orono; Dr. Owen Smith, Portland; committee on nominations, Dr. J. A. Ness, Auburn; Wm. T. Haines, Waterville; Raymond Pearl, Orono.

Meeting adjourned until 1.30 P. M., when the Association was called to order by C. E. Cobb of Denmark, acting as chairman.

Dr. Owen Smith was requested to explain the proposed Act for the election of the Commissioner of Agriculture, which he did.

REPORT OF COMMITTEE ON RESOLUTIONS.

Whereas, the citizens of the state, annually, send large amounts of money out of the state for their breeding animals, be it

Resolved, That this association do all in its power to assist local breeders to undertake more extensive operations, with the purpose of supplying the demand for improved stock, and that special attention be devoted to the encouragement of draft-horse breeding.

Whereas, the sheep industry in Maine has evidently declined in the past three decades and whereas, a preliminary study at Highmoor Farm to indicate an economic reason for this shrinkage is being carried on, be it

Resolved, That this Association appoint a committee to co-operate with the Station to further this matter.

Whereas, the live stock shows at the large fairs in Maine are degenerating, be it

Resolved, That following the recommendation of the advertising committee, made at the last annual meeting, we renew and insist that the so-called three State Fairs, held annually at Waterville, Lewiston and Bangor, provide for an Auction Sale Day of Live Stock, to be advertised as one of the days of each of these several fairs, to be held on their fair grounds, and at which any live stock, pure-bred or grade, which has been regularly entered and exhibited at said fairs, may be offered and sold at auction. And be it further

Resolved, That this Association will provide and pay for an auctioneer for such sales.

Whereas, the election of the Commissioner of Agriculture should be removed from politics, be it

Resolved, That the proposed bill for removing the election of the Commissioner of Agriculture from politics be endorsed by this Association and that a committee of three be appointed by the president to represent this Association in pursuance of such a bill.

We recommend that these resolutions be given full recognition, and committees duly appointed to carry out their needs.

Respectfully submitted,

L. C. HOLSTON,

OWEN SMITH,

C. D. WOODS,

Committee.

Voted to adopt the report of the committee.

The nominating committee presented the following names for officers for the ensuing year.

President, H. M. Moulton, Cumberland Center.

Vice-presidents:

Androscoggin, C. R. Leland, Mechanic Falls, R. F. D. 2.

Aroostook, W. R. Christie, Caribou.

Cumberland, C. E. Cobb, Denmark.

Franklin, C. P. Hamlin, East Wilton.

Hancock, C. W. Shea, Bar Harbor.

Kennebec, R. O. Jones, Winslow.

Knox, George E. Nash, Camden.

Lincoln, William Taylor, Wiscasset.

Oxford, A. D. Cummins, South Paris.

Penobscot, E. M. Atkins, Dexter.

Piscataquis, S. R. Woodward, Sebec Station.

Sagadahoc, W. M. Dingley, Richmond (P. O. Gardiner).

Somerset, L. G. Trafton, Skowhegan.

Waldo, S. A. Piper, Troy.

Washington, Mrs. B. B. Mansfield, Jonesport.

York, Herbert Coffin, Berwick.

*Secretary

Treasurer, A. H. Ellis, Fairfield.

*The secretaryship was left open, to be filled later by the executive committee, when the position of Extension Instructor in dairying, left vacant by the resignation of N. C. Sherwood, shall have been filled.

Executive Committee: President, secretary, treasurer ex-officio, E. E. Gifford, Bowdoinham; H. G. Beyer, Jr., 120 Exchange Street, Portland; J. A. Ness, Auburn; L. E. McIntire, East Waterford.

Delegates to Maine Federation: H. G. Beyer, Jr., 120 Exchange Street, Portland; C. L. Pike, Lubec.

Member Station Council: L. C. Holston, Cornish.

Visitor to the College: George H. Dunn, Norway, R. F. D. 2.

A ballot was held and the officers nominated were declared elected.

Voted, that the secretary be and hereby is instructed to write the members of the Association and request them to pay their dues promptly.

R. M. Gilmore, Secretary of the Central Maine Fair, asked that the Maine Live Stock Breeders' Association, or the various Maine Breed Associations, offer premiums at the Waterville Fair as one means for improving the live stock feature of the fair.

Voted to leave the matter to the State Breed Associations.

Voted, that the executive committee be instructed to have introduced, at the next session of legislature, a stallion registration law and to use all proper means to secure its enactment.

Meeting adjourned until 7.30 P. M., when it was

Voted, that a committee be appointed to bring before the legislature, the coming winter, the matter of more just reimbursement for pure-bred animals condemned for tuberculosis.

The following named men were chosen to serve on the committee: H. M. Tucker, David Moulton, L. E. McIntire.

Voted, that the executive committee be instructed to take some action at the next legislature to get an appropriation for a better live stock exhibition.

Copies of the addresses given during the meetings were not furnished the secretary by the several speakers. They are, from necessity, therefore, omitted from this report.

Respectfully submitted,

N. C. SHERWOOD,

Secretary.

BUSINESS MEETING OF MAINE DAIRYMEN'S ASSOCIATION.

The annual business meeting of the Maine Dairymen's Association was opened at 9.00 A. M. on Wednesday, December 6, 1916, by the president, Herbert M. Tucker, who gave the annual address, as follows:

ANNUAL ADDRESS OF THE PRESIDENT.

GENTLEMEN: On November 29, 1898, the first meeting of the Maine Dairymen's Association was held at Winthrop. Hon. B. Walker McKeen, then Secretary of the Board of Agriculture, presided at that meeting. The following officers were elected: President, Rutillus Alden, Winthrop; vice-president, W. C. Whitman, Turner; secretary, L. W. Dyer, Cumberland Center; treasurer, F. S. Adams, Bowdoinham; trustee, W. K. Hamlin, South Waterford. On adjournment, it was decided to meet in Portland, December 7, and at this second meeting, constitution and by-laws were adopted and the organization completed. As we, today, look back over the time that has elapsed since that first meeting, we cannot help a feeling of pride in what has been accomplished by, or with the assistance of, this association. Time will not permit a detailed account of all that we have done. Suffice it to say that the Maine Dairymen's Association has been ever on the alert to help the dairy farmer in every way possible.

The year just past has been a history maker for the dairy interests of New England. The various methods of shipping milk and cream led to very unequal rates, which were constantly growing worse, until there was a general protest from shippers all over the eastern states. This led to a hearing before the Interstate Commerce Commission. You will remember that this association, a year ago, before it had any knowledge of what other associations or other states were going to do, voted to send a man to fight for the interests of the Maine

dairymen. We chose Frank S. Adams, believing him to be better qualified for that job than anyone else. Many others all over New England joined in the movement, so that an organization was perfected and the dairy interests presented a solid front before the Commission, which was the means of bringing about what seems to be a fair and just rate to all shippers of milk and cream. I will not go into this in detail, as I have asked Mr. Adams for a report on the matter.

The next important event, and one in which every dairyman in Maine was interested, either directly or indirectly, was the effort of the New England Milk Producers' Association to induce the milk contractors of Boston and other Massachusetts cities to give a price for the farmers' milk which would be in keeping with the present high cost of grain and farm labor, so that there might be a reasonable margin of profit in the dairy business. By special invitation, Mr. Adams and I attended the directors' meeting of the New England Milk Producers' Association in Boston, when the demands were formulated, after a careful study and discussion of the situation, which brought about the so-called milk strike. The fight was a long and hard one. Milk contractors immediately went up one cent a quart and one cent a pint on the price of their milk to the consumer; but only wanted to give the farmers one-third of that rise in price, and if the farmer had only kept still, that is about the proportion that he would have received—one-third, against two-thirds to the contractor. But the farmer did not keep still; he had several things to say and he said them. He said that in the past few years, with the steady increase in the price of labor and with the increasing demands that were made by the contractors—which required more labor, he was not making in the dairy business the percentage of profit that he should from the capital invested; he said that the cost of the cow had doubled in the past few years; he said that, with the present extreme scarcity and high price of help and the extremely high price of grain, a correspondingly higher price for dairy products must come. It was simply a fight for existence. Thanks to the able generalship of Richard Pattee, secretary of the Producers' Association, with President Colby and a small army of intensely loyal men in the field, the farmers won, and there is not a dairyman in Maine so remote that he will not

get the benefit of this contest. We owe Secretary Pattee and the New England Milk Producers' Association a debt of gratitude, and I trust that before we close this session we will unitedly express that sentiment to them. We did help out a little in a financial way, as you will see by the report of our treasurer that I authorized him to send twenty-five dollars to their treasurer.

I note with interest that the dairymen who ship milk into Portland are asking five and one-half cents a quart, delivered in Portland. They should get it. Everyone present who is producing milk knows that the margin of profit will be small at that price.

Now, from all this strife and turmoil over one of the greatest industries of our state, what may we learn? Just this: That we need something and need it badly, and that is organization. The reason this need has not been more apparent in the past is, that Maine has been more fortunate than other New England States in having a corporation like the Turner Center Dairy Association to do business with. The Hood or Whiting Company have to pay Maine farmers a fair price because they are obliged to meet the Turner Centre price. If you will but compare the prices these companies have been paying Maine farmers during the past ten years with the prices they have paid in sections of Vermont, where they had no competition, you will recognize the truth of my statement. I am not throwing bouquets to Mr. Bradford, but in justice to him I will say that I consider his method of buying by paying for the butter-fat and the skim-milk separately, and also having the milk or cream of each man's herd sent in his own cans so that each man's lot has to stand on its own merit, the fairest method yet devised by any creamery company. But while we have, in most cases, no reason for any complaint, I believe that we, as farmers and dairymen, should have just as strong an organization as the Turner Center, the Whiting or the Hood Company. It would not be my purpose to use such an organization to antagonize the contractors or creamery companies; on the other hand, it should be used to bring about a better understanding between the producer and the dealer and consumer. The producers of milk and cream supplying the Turner Center know almost nothing as to the cost and methods of handling that cream

before it is finally placed before the customer in just the quality, quantity, and at the same time that he wants it ; and, in turn, Mr. Bradford knows very little as to what it has cost the farmer to produce that milk and cream. I believe, if we were thoroughly organized, it would be of mutual benefit to have a committee (we will say the executive committee of that organization) meet Mr. Bradford once or twice a year, and each get a look from the other's viewpoint, and each learn from the other what he is up against. I believe if this were done it would seldom be necessary to call a milk strike ; but in case it were necessary, we would be in a position to do something. I see that there is a movement on foot to have a general organization for all New England. I was sorry that my business was such that I could not attend the meeting which was held in Springfield, Mass., last week. I am convinced, beyond a reasonable doubt, that no one will look after the farmer's interests unless he does it himself. We cannot sit down and blame others for looking after their own business ; rather let us get busy and look after our own.

DR. WOODS : There were some things in the president's address, as I listened to it, that should be considered by the association, and I move that it be received and referred to the committee on resolutions, to be reported upon later.

This motion was passed.

REPORT OF THE SECRETARY.

To the Members of the Maine Dairymen's Association:

The president of the Association met the presidents of the Maine Live Stock Breeders' Association and the Maine Seed Improvement Association, together with representatives of the Maine Department of Agriculture, in conference at the office of the Commissioner of Agriculture, June 30, 1916. At this conference certain matters pertaining to the annual meetings of these associations were acted upon, as follows:

Voted, to hold the next annual meeting, December 4-8, 1916.

Voted, to accept the invitation extended by the Augusta Board of Trade to hold the annual meeting in Augusta, pro-

vided suitable arrangements could be made and accommodations secured.

Voted, that a committee, comprising L. S. Merrill, C. S. Pope, J. H. Blanchard and E. A. Rogers, confer with the Augusta Board of Trade concerning arrangements and that the committee be given power to change the place of meeting if found necessary.

Mr. Blanchard reported later that he and Mr. Rogers had conferred with the Board of Trade and that the accommodations and arrangements were satisfactory.

The executive committee of the association held a conference October 30, with the representatives of the Maine Live Stock Breeders' Association, the Maine Seed Improvement Association and the State Dairy Instructor, at the office of the Commissioner of Agriculture, to settle several matters not previously adjusted.

The following persons were present: Maine Dairymen's Association: H. M. Tucker, president; Leon S. Merrill, secretary. Maine Live Stock Breeders' Association: C. S. Pope, president; N. C. Sherwood, secretary. Maine Seed Improvement Association: E. A. Rogers, secretary. Department of Agriculture: J. H. Blanchard, dairy instructor.

Mr. Blanchard, from the Committee of Arrangements with the Augusta Board of Trade, reported that the Board would furnish hall for exhibits and other necessary rooms for holding meetings, janitor service, etc., free of charge and would also guarantee a fund of \$50 toward the expenses of holding the meetings.

Voted, to accept the report.

Voted, to hold the banquet Thursday evening, December 7, and elected the following committee of arrangements for same: Frank S. Adams, Bowdoinham; C. S. Pope, Manchester; E. A. Rogers, Augusta.

Voted, that Tuesday, December 5, should be assigned to the Maine Live Stock Breeders' Association and known as "Live Stock Breeders' Day;" that Wednesday, December 6, should be assigned to the Maine Dairymen's Association and known as "Dairymen's Day;" and that Thursday, December 7, should be assigned to the Maine Seed Improvement Association and known as "Seed Improvement Day."

Voted, that so much of the Friday forenoon session as might be needed should be assigned to the Maine Seed Improvement Association as an offset for the loss of Thursday evening.

Voted, that J. H. Blanchard serve as committee of arrangements for the Monday evening exercises.

Voted, that the exhibit of machinery, equipment and supplies be placed in charge of Dr. L. S. Merrill.

At this point the conference adjourned and the executive committee and J. H. Blanchard, Dairy Instructor, held a meeting to discuss the program and other arrangements for holding the State Dairy Conference.

Voted, to hold the annual business meeting of the association, Wednesday morning, December 6, at 9 o'clock.

Voted, to recommend to the Commissioner the following persons as judges: Butter and cheese, Orin Bent, Boston; milk and cream, E. E. Harris, Skowhegan, and J. F. Thomas, Orono. The second place on the judging committee on milk and cream to be filled by the Department of Agriculture.

The Dairy Instructor requested the secretary to solicit exhibits of dairy products for the State Dairy Conference, which was agreed to.

The committee voted to adjourn.

Respectfully submitted,

LEON S. MERRILL,
Secretary.

Voted, that the report of the secretary be accepted.

President Tucker made appointments of the various committees, as follows: Committee on Resolutions, L. S. McIntire, Charles H. Crawford, Charles D. Woods. Committee on Nominations, C. L. Jones, Charles Doe, W. W. Pike.

PRESIDENT TUCKER: It will be shown, at the time of the treasurer's report, that we have to expend quite a sum of money to carry on the special work of the year. In addition to our usual expenses, we have had the expenses connected with the hearing before the Interstate Commerce Commission and the drain upon the treasury has been pretty severe. Of course, the expense of this special work has come out of our treasury, and it is right it should; but we are particularly anxious to get

as many new members this year as possible and we want all the old members to renew their membership, in order that our treasury may be replenished.

On motion of Dr. Woods, it was

Voted, that the secretary be instructed to send notices to all members of the association not in attendance upon this meeting, asking them to renew their membership and contribute their membership fees.

A report of the delegate to the milk hearing before the Interstate Commerce Commission was called for, and Frank S. Adams reported, as follows:

REPORT OF COMMITTEE ON MILK HEARING BEFORE INTERSTATE COMMERCE COMMISSION.

At the last annual meeting of this association it was known that freight rates to Boston on milk had been increased 50 per cent and on cream, 100 per cent by the new freight tariff, and that this had been held up by the Interstate Commerce Commission so that this Commission could have time to investigate the whole question and give all parties interested an opportunity to be heard. It was supposed that this hearing would be held in Washington, D. C., but very soon it was learned that it would be held in Boston for the New England states. I was appointed a committee to represent the Maine Dairymen's Association at this hearing.

Sometime the first of January, 1916, the Master of the New Hampshire State Grange, Wesley Adams, called a meeting in Boston for January 21. Boards of Agriculture, Dairy Associations, State Colleges, with other agricultural organizations, were invited to send representatives to this meeting to devise ways and means for the milk producers of New England to be properly represented at the milk hearing. This meeting was well attended from the four New England states most interested, namely, Massachusetts, Vermont, New Hampshire and Maine. From Maine, those present were Mr. Guptill of the Board of Agriculture, Mr. Alden of the State Grange and Mr. Adams of the Dairy Association. After meeting and organizing, it was learned that some of the milk contractors were at the hotel where this meeting was held—Mr. Bradford of the Turner Center Creamery Association and Mr. Hood of Hood

and Company; they were invited into the meeting to give their views as to how this increased freight tariff would affect the dairy industry of New England. Also, representatives of the Boston and Maine and Maine Central Railroads, and John Orcutt of the Boston Chamber of Commerce, were present. After listening to these gentlemen, the committee went into executive session and the matter was thoroughly discussed. It was thought best to organize a permanent committee consisting of one member from each of the New England States: Richard Pattee of New Hampshire, Willis Bartlett of Massachusetts, Mr. Smith of Vermont, and the Commissioner of Agriculture (Mr. Guptill) of Maine, were chosen as the members of this committee. On account of other business, Mr. Guptill declined to serve, and I was substituted as the member from Maine.

The committee then adjourned to meet in Boston on February 16.

At the meeting on February 16, Richard Pattee was elected chairman of the committee and the executive officers, and it was voted that Mr. Pattee should give his whole time to the matter until the end of the hearing. Willis Bartlett was elected treasurer.

The committee adjourned, to meet at the call of the chairman, and each member of the committee was instructed to solicit funds in their several states for the use of the committee at the hearing; as far as I know, Maine and New Hampshire were the only states that responded—from Maine, the State Grange and the Dairymen's Association each contributed one hundred dollars; from the New Hampshire State Grange, were contributed one hundred dollars and from the New Hampshire Dairymen's Association, three hundred dollars. It seems that Vermont thought best to go it alone, under the leadership of their Commissioner of Agriculture, Mr. Brigham, and they certainly put up a good fight. Massachusetts went Quaker meeting style; whenever the spirit moved, someone would be heard.

We met again in Boston on the day of the opening of the hearing, and I think there were nearly fifty different parties entered for appearance. Among those from Maine were the Dairymen's Association and the State Grange. R. L. Cum-

nings and L. E. McIntire were present to represent the State Grange. The railroads were the first to be heard, and then the milk contractors.

I staid in Boston and attended the hearing three days at this time. It looked as though it might be several weeks before the producers would be heard, so I came home to wait the call of the chairman. I neglected to say that at this time it seemed advisable to employ counsel, so Mr. Worthing, an old friend of Mr. Pattee's, was engaged. I went back to Boston, February 28. Several milk producers were there from New Hampshire and Maine at the time the producers were heard, and their testimony was certainly very satisfactory.

The decision of the Commission is now history to Maine. I think it is quite satisfactory. Most of the milk from Maine is shipped by fast freight, which is twenty-five per cent less than passenger service. The increase is not very heavy; if you want to know just how much, Mr. Bradford can tell you better than I can.

In August, with some of the officers of the State Grange and other agricultural organizations, I attended a meeting in Portland, by invitation of the officials of the Maine Central Railroad, to discuss the new tariff and how it would affect the dairy industry of Maine. And here I want to say that the officials of the Maine Central Railroad seemed disposed to do everything possible to help the dairy industry.

In September, with Mr. Tucker, the president of the Association, I attended a meeting of the New England Milk Producers' Union in Boston. At the first of this meeting several of the milk contractors were present and representatives from the Boston and Maine Railroad, and Mr. Orcutt, of the Boston Chamber of Commerce. It was agreed by the Milk Producers' Union that, unless they were paid fifty cents per can of eight and one-half quarts, delivered in Boston, they would not ship this milk to the contractors; the result was the milk strike which was won by the producers and has caused an advance in milk all over New England.

After consulting with the president, Mr. Tucker, I sent a check for twenty-five dollars to H. L. Webster, treasurer of the Milk Producers' Union, to assist in the milking strike.

In closing, I want to congratulate the milk producers of Maine and the other New England states on what has been accomplished in the way of increasing prices and bringing about a better understanding of the business—not only by the producers, but by the consumers, as well.

Respectfully submitted,

FRANK S. ADAMS.

Voted, that the report of the committee on milk hearing before the Interstate Commerce Commission be accepted.

Voted, to tender Mr. Adams a rising vote of thanks for his work done on the milk hearing committee.

PRESIDENT TUCKER: I would say that, owing to the fact that so many of the bills that appear in the treasurer's report were contracted by the treasurer himself, he felt a little delicate about bringing his report. Upon his request, an auditing committee, composed of Dr. Moulton and W. G. Hunton, have checked over the accounts.

The report of the auditing committee was called for and was read by the secretary, as follows:

AUGUSTA, Dec. 9, 1916.

We, the undersigned, hereby certify that we have carefully examined the foregoing account of F. S. Adams, Treasurer of Maine Dairymen's Association, and find it correct.

H. M. MOULTON,

W. B. HUNTON,

Auditing Committee.

The report of the treasurer was called for.

MR. ADAMS: I could not, of course, have in this report an itemized bill for all the expenses, but I have every bill on file and any gentleman who so desires may go over these bills.

REPORT OF TREASURER.

Receipts.

1915

Dec. 6,	Balance from 1915	\$277 70
Dec. 10,	Ellen Alden, 42 membership dues..	42 00
	Creamery Package Company.....	2 50

1916

Jan.	2, Leon S. Merrill, 26 membership dues	26 00	
July	3, Lynian Blair, 1 membership due..	1 00	
Dec.	1, Interest	6 50	
			<hr/> \$355 70

Expenditures.

1915

Dec.	10, Paid for two watches, one fountain pen for the boys for the prize essays	\$33 00	
	Complimentary tickets at the banquet	8 00	
	Hotel bills for the boys who wrote prize essays	5 00	

1916

Jan.	25, One-third expenses printing banquet tickets	1 67	
Feb.	23, A. Willis Bartlett, Treas. of Committee in charge of milk hearing Expenses, F. S. Adams, attending milk hearing before Interstate Commerce Commission	31 11	
		68 89	
Apr.	9, Expenses, F. S. Adams, attending a conference in Portland.....	2 85	
Sept.	13, Two days, per diem and expenses, attending hearing in Boston...	20 32	
Oct.	3, H. L. Webster, Treasurer N. E. M. P. A.	25 00	
Nov.	3, H. M. Tucker, expenses to Boston	17 50	
	22, Prof. W. P. Lockwood, part of expense for booth, National Dairy Show	24 86	238 20

Cash on hand, Dec. 1, 1916.... \$117 50

Respectfully submitted,

F. S. ADAMS,
Treasurer.

Voted, that the report of the treasurer be accepted.

The report of the visitors to the College of Agriculture was called for.

MR. HOLSTON: My report is not quite ready, and I will ask that you allow it to go over until afternoon, if it is possible.

PRESIDENT TUCKER: I think this will be all right; there will be some other business matters scheduled for the afternoon meeting, so we will have a short business session immediately after dinner.

REPORT OF DELEGATES TO FIFTH ANNUAL MEETING OF MAINE FEDERATION OF AGRICULTURAL ASSOCIATIONS AT ORONO.

The notable feature of the annual meeting of the Maine Federation of Agricultural Associations, March 8, 1916, was the request of several of the members, that we undertake more constructive work for the agricultural interests of the state. At first, the efforts of the Federation were of necessity directed chiefly toward internal organization, aiming to weld a practical working unit of the associations represented.

Considerable work has been done by the members along educational lines to stimulate production and improve the quality of their products. The time now seems ripe for united action for the establishment of better systems and facilities for distribution and marketing. If we are to secure such an organization as the New York Department of Foods and Markets, it must be through the efforts of our State Federation.

In obtaining legislation favorable to its members, the Federation is already making its influence felt. Its representatives have actively supported such measures as packing laws, drafted by the Pomological Society, and building programs of the College of Agriculture; to further extend its influence in this direction, the Federation voted that its executive committee be constituted a legislative committee, with power to act in the interest of the Federation and its members.

On account of the failure of any nominee to obtain a majority of the votes of the Federation for election to the Agricultural Hall of Fame, no tablet was erected this year. The recom-

mendations of the committee appointed at the previous annual meeting, to revise the method of election, were accepted. The Federation then balloted directly on the nominations already made, electing Walter Balentine. The tablet will be installed in 1917.

In this connection, it seems appropriate to urge upon our Association the importance of instructing its delegates for this election and also in regard to any other business it wishes brought before the meetings of the Federation. To be of the greatest service to its members, the Federation must first know their needs. The initiative lies with ourselves.

As the time available for business was found altogether inadequate, it was moved and voted that the next annual meeting consist of three sessions: Afternoon, evening and morning.

At the evening session of the meeting, the principal topic for discussion was: "The Method of Election of the Commissioner of Agriculture." All seemed agreed that the election should be taken out of politics, but no satisfactory plan for accomplishing this was adduced. A discussion of "The Relation of the Various Branches of Organized Agriculture to Each Other," followed. Emphasis was laid upon the need of more cordial relations between our member organizations and a better understanding of our mutual aims. To be able to coöperate, we must first know each other. That the Federation has accomplished much in this field, no one who has followed its brief history can doubt and here, we believe, lies one of its greatest opportunities for present service.

Respectfully submitted,

H. M. TUCKER.

ALTON S. POPE,

Delegates.

MR. POPE: I would like to say to the Association at this time that I believe our delegates should be more definitely instructed. Last spring we had thirty members at the meeting and only two or three had any instructions from the associations they represented; we had but little idea of what we were going to do or how we were going to accomplish anything.

The report of the delegates to the Maine Federation of Agricultural Associations was accepted and approved.

REPORT OF THE COMMITTEE ON BREEDING.

To the Maine Dairymen's Association.

GENTLEMEN: Your Committee on Breeding begs to present herewith its report for the year 1916. As in former cases, this report will deal with the progress which has been made in the animal husbandry investigations carried on by the Maine Agricultural Experiment Station. It is a pleasure to be able to report that these investigations have progressed in a generally satisfactory manner during the past year. In the succeeding portions of this report we shall consider one by one the different lines along which these investigations are progressing.

1. *Coöperative Breeding Records.*

The coöperative breeding record project, in which about 200 of the leading breeders of cattle in Maine, and a few outside of the state, have contributed for purposes of study, exact records of the breeding operations in their herd, has gone forward satisfactorily. A very large amount of new material has been collected in the year. It is expected that with the completion of the Service Records for the calendar year 1916, there will be in hand approximately 2,000 complete and connected service and birth breeding records. This constitutes a wholly unique mass of material for the study of many vitally important problems in the physiology of reproduction in cattle. As the amount of material mentioned will be amply sufficient for the study of the problem in hand, it is proposed to bring this breeding record project to a close at the end of September, 1917. No more service records will be asked for after January 1, 1917, and only such birth records as are needed to complete the service records already in hand.

We wish again to express our great indebtedness to the breeders who have so carefully, and conscientiously, and willingly aided in the prosecution of this phase of the animal husbandry investigations.

2. *Physiology of Reproduction.*

In all of its work the Maine Agricultural Experiment Station endeavors in every possible way to meet the most pressing immediate needs of the farmers of the state for practical informa-

tion at the same time that it is carrying on fundamental investigations, having for their object the discovery of the underlying principles of science on which agricultural practice depends. A good index of the immediate practical needs of the farmer is found in the inquiries and requests for information which he sends into the Station. Experience shows that a large portion of the correspondence of the Station, relating in any way to breeding, has to do with inquiries concerning one or another phase of the general subject of the *physiology* of breeding. There is a great dearth of information in the available agricultural literature, regarding the biological or physiological processes concerned in reproduction and breeding.

As has already been pointed out in the preceding portion of this report, the Experiment Station, through its coöperative breeding record project, is in possession of a unique body of original material throwing light on many of the most puzzling of these biological questions relating to reproduction and breeding in cattle. In view of this fact and because of the very evident interest in this subject, and desire for information about it, it has seemed wise to devote a considerable amount of time during the past year to the preparation of a comprehensive bulletin on "The Physiology of Breeding," with "Special Reference to Dairy Cattle." This bulletin is now nearly ready for the press. It is expected that it will be issued as an appendix to this report, sometime early in the year 1917. It is estimated that it will make a volume of about 150 printed pages. This will, of course, be distributed free to residents of Maine.

Some idea of the scope of this bulletin is given by the chapter headings which are as follows: Chapter I—The Comparative Anatomy of the Reproductive Organs in Domestic Animals. Chapter II—The Oestrus Cycle (Heat Period) in Mammals. Chapter III—The Germ Cells. Chapter IV—Insemination and Fertilization. The Vitality of Discharged Germ Cells. Chapter V—Pregnancy and Parturition. Chapter VI—Lactation. Chapter VII—Abortion. Chapter VIII—Sterility. Chapter IX—The Age and Condition of Breeding Stock. Chapter X—Sex Determination. Chapter XI—Secondary Sex Characters and Castration. Chapter XII—Telegony, Saturation and Maternal Impressions.

The book will be thoroughly illustrated throughout and, it is believed, will serve as a useful purpose in the hands of breeders of Maine.

3. *The Control of the Sex Ratio.*

One of the primary objects for which the coöperative record project was inaugurated was to collect statistics bearing on the question as to whether the proportion of males to females in cattle could be influenced or controlled by the time of service relative to the beginning of the period of heat. Some earlier statistics collected by the Station appeared to indicate that there was a possibility of influencing the sex ratio by paying attention to this point. It was believed to be of such extreme importance as to justify the careful study of the matter on the basis of much more extended statistics. These statistics we have now collected and analyzed and shall publish as soon as they can be prepared for the press. In the meantime the Committee desires to report now that, with the more extended statistics in hand, it appears to be conclusively established that there is no definite or permanent relation between the time in the heat period at which the cow is served and the sex of the offspring. The apparent relation between these two factors, which is believed by many breeders to exist and which our earlier statistics appeared to indicate, seems now to be purely accidental and to have arisen only because of the comparative meagerness of the statistics on which the matter was discussed.

4. *Inbreeding.*

The investigations on the effect of inbreeding in cattle in relation to productive qualities have been actively prosecuted during the past year. Some preliminary work carried out in 1915 seemed to show that in Jersey cattle there was a positive relationship between the degree of inbreeding and productivity in advanced registry cows. The nature of the relationship was, that the closer the degree of inbreeding within certain limits the higher the productivity. It seemed extremely important to determine on much more extensive material whether this relationship was general. This has involved the working out of a large number of pedigrees which are now completed. It is hoped that the report on this work may be published early in 1917.

5. *The Analysis of Milk Records.*

The intensive study of existing record of milk and butter-fat production, published in the Advanced Registry reports of the various breeds, has been prosecuted energetically during the past year. As was pointed out in the last report of this Committee, the necessary age correction factors for milk production have now been completely worked out for the three breeds, Jersey, Holstein-Friesian and Ayrshire. The necessity for these age corrections has been emphasized in former reports. Before it is possible to make any just comparison between the productivity of two cows, it is necessary that a proper scientific correction be made for their difference in age at the time when the milk records were made. The working out of proper corrections has involved a great deal of extremely laborious mathematical work. This work, however, is now completed and we are able to use these correction factors in a constructive way.

As a first contribution in this direction, we have considered in the Jersey breed the influence of certain advanced registry bulls on the productive qualities of the breed. A complete report on this phase of the work will be issued later as an appendix to this report.

TABLE I.

Showing the Influence of Certain Jersey Bulls on the Breed, as Indicated by the Average Corrected Yearly Production of Butter Fat of Their Daughters as Compared With That of the Dams of These Daughters.

NAME OF BULL.		Pounds of Butter Fat by which daughters' average is different from dams'.	
Group A.	Bulls which significantly lowered the productivity of their daughters.		
		+	-
	Hector Marigold, 59121.....		106.55
	Hood Farm S. Tormentor, 76311.....		61.59
	Mabel's Raleigh, 77913.....		46.00
	Eminent's Raleigh, 69011.....		41.74
	Irene's King Pogis, 73182.....		35.12
	Raleigh's Fairy Boy, 83767.....		31.72
	Lady Letty's Victor, 65020.....		21.72
	Hood Farm Torono 20th, 82854.....		21.27
	Hood Farm Torono 21st, 83413.....		20.85
	Mabel's Poet, 65780.....		11.88
Group B.	Bulls which neither lowered nor increased productivity significantly.		
	Interested Prince, 58224.....	0.41	
	Gedney Farm Oxford Lad, 71238.....	1.57	
	Lookout Torono, 78593.....	1.70	
	Noble of Oaklands, 95700.....	4.24	
Group C.	Bulls which significantly increased the productivity of their daughters.		
	Flying Fox's Victor, 64768.....	33.94	
	Tonona Pogis, 78657.....	47.00	
	Gamboge's Knight, 95698.....	47.49	
	Hood Farm Pogis 9th, 55552.....	51.83	
	Mabel's Oxford Lad, 66518.....	60.75	
	Royal Majesty, 79313.....	81.34	
	Fontaine's King, 65641.....	101.37	
	Hood Farm Pogis 34th, 63300.....	140.48	
	Hood Farm Torono, 60326.....	148.56	

+ Denotes that daughters' average was *higher* than dams' average.

- Denotes that daughters' average was *lower* than dams' average.

Table I shows, in abbreviated form, the effect of 23 of the best known Jersey sires on the best average butter-fat production of their daughters as compared with the dams of these daughters, when both are put on the same age basis. It appears from this table that about one-half of the bulls in this group got daughters which, on the average, were poorer producers than the dams of these daughters. In some cases the deleterious effect of the bull on the productive quality of the breed was extremely marked. On the other hand, certain of the bulls in this group, notably,

Hood Farm Torono, exercised an extraordinarily beneficial effect upon the productive qualities of the breed.

6. *New Coöperative Project.*

Your Committee wishes to bring to the attention of the Association a plan for a new coöperative project which the Maine Agricultural Experiment Station desires to take up with the breeders of Maine, provided they are interested in the matter. The most important thing which a breeder of dairy cattle desires to know is whether his animals are transmitting productive qualities to their progeny. In particular, this information is desired in regard to the herd bull, which constitutes one-half of the herd. If, by chance, he is exercising a deleterious effect on the productive qualities of the herd, he may, in a few years' time, do a great deal of harm. It would appear to be beyond doubt or question for practical purposes, that if a bull's daughters are, on the average, poorer milkers, or poorer in the quality of their milk, than the dams from which they came, then the bull which produced them is exercising a harmful effect upon the herd. On the other hand, if a bull's daughters are, on the average, measurably better than the dams from which they came in productive qualities, then that bull is exercising a beneficial effect on the herd. What the breeder wants to know at the earliest possible moment is, which of these two categories his herd bull falls into. The Maine Agricultural Experiment Station has worked out a plan whereby it is believed that it will be possible to furnish this sort of information to the breeders of the state more quickly and in a much more definite and precise form than they have ever been able to acquire it hitherto.

The plan of coöperation involves the following points: Any farmer who will comply with certain conditions may at any time have made for him by the Experiment Station an official daughter-dam test.

The conditions are

1. That he shall have in his herd, at the same time, both the dam and her daughter to be tested. Or failing the actual possession of the animals at the time, he must be able to furnish satisfactory records of the milk production of the missing animal, either daughter or dam, together with the other necessary information for making the test.

2. The breeder or farmer undertaking such a coöperative test, under the directions furnished by the Experiment Station, must agree to keep a careful and accurate record of the milk of the animals on test over a period of time mutually agreed upon (7 day, 14 day, 30 day, 90 day or one year).

3. Samples of the milk of the animals on test shall be regularly taken, according to directions which will be furnished, and sent to the Maine Agricultural Experiment Station. There an analysis of the milk will be made and the necessary calculations for making proper age corrections for the animals concerned will be carried out. An official report will then be rendered to the breeder as to whether, in the particular case involved, the sire produced a daughter which was a better or a poorer producer than her dam when both are compared on an equal age basis.

4. The only expense to the breeder involved in having such a test carried through is the expressage on the samples of milk to Orono. This coöperative daughter-dam testing project will be open on precisely equal terms to owners of grade cattle as well as owners of pure-breds. A Station circular giving full details in regard to this coöperative testing project will probably be issued shortly. We shall be very glad for an expression of opinion from the members of the Association in regard to this proposed coöperative project. If the farmers do not want to undertake this sort of work, the Station does not wish to force the matter in any way.

7. *Breeding Experiments.*

The experiments in cattle breeding which are being carried out with the University of Maine have proceeded satisfactorily during the year. The only known method of making an adequate analysis of the laws of heredity is that of experimental hybridization. It is the method which has led to all that we know of heredity at the present time. No other method to replace experimental hybridization has yet appeared in the literature of science. It is the method which was used by Darwin, by Mendel, by de Vries, by Johannsen, by Bateson and by every other worker who has significantly advanced our knowledge of heredity.

In view of these considerations we are endeavoring, as rapidly as possible, to build up an experimental herd of first generation hybrids between low milking and high milking breeds, on the other hand, and between low testing and high testing breeds, on the other hand. It is gratifying to be able to report that this experimental hybrid herd is now nearly completed. To date, a total of 34 animals have been produced, of which some 13 will be permanently retained in the experimental herd. The remainder have been and will be disposed of as fast as they pass the age of 200 days when certain records are taken on them. To complete the herd, so that analytical experiments may go forward, there are now required only six heifers. Owing to the fact that a complete control of sex is impossible, it is likely to take at least one or two years more to complete the experimental herd. After these six heifers have been obtained, no more first generation hybrids will be bred.

The breeds used in the formation of the experimental herd are the Jersey, the Holstein-Friesian, and the Aberdeen Angus. It is interesting to note that one first generation hybrid animal is now in milk, having borne a heifer belonging to the second hybrid generation on April 10, 1916. Another heifer belonging to the second hybrid generation was born August 17, 1916. It is the second hybrid generation which yields the important results in Mendelian experiments.

Your Committee has had information to the effect that some persons, who were among the most enthusiastic advocates of the inauguration of these experiments, are now complaining because the animals produced in the experiments are hybrid animals. Such a complaint simply shows a profound ignorance of the laws of heredity and the way in which those laws were discovered. As we have already said in this report, the only possible way known to science to make any adequate analysis of the laws of heredity is the method of experimental hybridization. If one objects to the following of this method of study and experimentation, he is really objecting *to any attempt being made towards further enlightenment on this subject*. Your Committee wishes to make it very clear and emphatic that he who advocates the cessation in these experiments of experimental hybridization or cross-breeding is thereby advocating the stopping of any attempt to acquire any further knowledge of the laws of heredity in cattle.

We feel that those who make this petty and shortsighted criticism of the experiments in progress at the University of Maine do not, in any respect whatsoever, represent the opinion of the progressive and intelligent cattle breeders of this state. We feel that the farmers and breeders of this state, who have any real knowledge or comprehension of what breeding means, desire to see made now, just as they did when they helped to inaugurate the work, the most searching, thorough-going and careful investigations on the subject which it is possible to carry out by the most approved scientific methods.

The Committee would again emphasize to the Association the fact that, from the very nature of the material, progress in this experimental work must necessarily be slow. We have been working with the utmost rapidity possible for four years and have not yet completed the necessary experimental herd. When this work was begun it was pointed out that ten years was the shortest period of time in which definite and conclusive results could possibly be even hoped for. Nothing which has occurred since has caused us in any way to change our estimate on that point. The work is proceeding as rapidly as it is possible for it to proceed, with the facilities at hand and with due regard to thoroughness. Just as soon as definite results are received they will be reported to the Association.

It is recommended that the Committee on Breeding be continued, as its work is not finished.

Respectfully submitted,

RAYMOND PEARL, *Chairman.*

F. S. ADAMS,

W. G. HUNTON.

AFTERNOON-SESSION.

Meeting called to order by the president.

The following officers were elected for the ensuing year: President, H. M. Tucker, Canton; Vice-President, L. C. Holston, Cornish; Secretary, Leon S. Merrill, Orono; Treasurer, F. S. Adams, Bowdoinham; Trustee, J. A. Ness, Auburn; Delegates to Federation of Agricultural Associations, H. M. Tucker, Canton, and A. L. Pope, Manchester; Visiting Committee to the College of Agriculture, A. E. Hodges, Fairfield Center;

member of the Experiment Station Council, F. S. Adams, Bowdoinham.

The following communication from the Bangor Chamber of Commerce was read by Mr. Copeland:

"Will you please convey to the Maine Dairymen's Association, the Maine Seed Improvement Association and the Maine Live Stock Breeders' Association, a cordial invitation from Bangor Chamber of Commerce to hold the annual meeting of these associations in Bangor in 1917. This organization will hold itself in readiness to assist in every way possible to make the meeting in Bangor an unqualified success and we trust we will have an early response notifying us of the acceptance of this invitation.

Yours very truly,

BANGOR CHAMBER OF COMMERCE,

W. A. HENNESSY, *Secretary.*"

Voted, to refer the communication from the Bangor Chamber of Commerce to the Executive Committee.

REPORT OF COMMITTEE ON RESOLUTIONS.

Resolved, That this association favors legislative action that looks to the removal of the appointment of the Commissioner of Agriculture from the sphere of politics and the continuity of office and, hereby, instructs its executive committee to work in coöperation with the committees from other organizations to that end.

Resolved, That the Maine Dairymen's Association endorses the County Demonstration work as carried out under the direction of the College of Agriculture, and strongly urges the increase of state support to keep pace with the amounts available from the Federal Government, under the provisions of the Smith-Lever act, in order that this demonstration work may be rapidly extended into the other counties of the state.

Resolved, That this association heartily endorses and will give every possible aid to the securing of an appropriation for a new dairy building at the University of Maine.

Resolved, That this association desires to express its appreciation of the services rendered the dairymen of New England by Richard Pattee, Secretary of the New England Milk Producers' Association.

Resolved, That this association favors the formation of an association, to include all of New England, for the purpose of unifying and advancing the interests of producers of milk, and hereby instructs its executive committee to further such an organization.

Resolved, That this association tenders its thanks to those who have made exhibits of dairy machinery, appliances and products. To the University of Maine and to the State Department of Agriculture for their coöperation; to the Chamber of Commerce and City Government of Augusta for their liberal entertainment, and to the press for extended notices and reports of the meetings. Be it

Resolved, That this association again expresses its approval of the joint meetings with the Maine Live Stock Breeders' and the Maine Seed Improvement Associations, and hereby instructs its Executive Committee to arrange for a joint meeting in 1917, if such shall be found to be practicable.

Respectfully submitted,

L. E. McINTIRE,

CHARLES H. CRAWFORD,

CHARLES D. WOODS,

Committee.

REPORT OF VISITOR TO THE COLLEGE OF AGRICULTURE.

It gives me great pleasure to report to you that the demands of young manhood for instruction at the College of Agriculture are constantly increasing. This means growth to the farmers' interests in this state and other states which call the graduates to their assistance.

There are two needs at the college that are imperative, in order to turn out students as thoroughly equipped as we would wish.

First, the dairy stock is not what it should be to place the ideal of the dairy student on a sufficiently high plane to go out into the world and demonstrate to the farmers what they should strive to attain. I would recommend that some action be taken to assist the college in obtaining such stock as should properly be the property of such an institution.

Second, the dairy building is so inadequate, it is found to be necessary to cut down, for lack of room, the requirements for dairy students. The number of students to take this course has to be regulated to conform to conditions.

Don't you think that every student who attends the University should get this instruction? If you do, why not use your influence to secure the proper facilities?

I certainly believe that the College of Agriculture of the University of Maine is doing everything in its power to aid in improving agriculture and its condition in the state and to help any of us with our problems.

Respectfully submitted,

L. C. HOLSTON,
Committee.

Voted, that the report of the visiting member to the College of Agriculture be received and adopted.

BUSINESS MEETING MAINE SEED IMPROVEMENT
ASSOCIATION.

ANNUAL ADDRESS OF THE PRESIDENT.

RALPH L. COPELAND.

As we are assembled for this seventh annual meeting of the Maine Seed Improvement Association it gives me great pleasure to note the interest manifest and the progress made since the first organized movement was started in Maine for seed improvement.

Although seven years seems a long time, it takes time to establish a movement that has to do with the general public, especially when that movement is connected with the State Department, the head of which, in the infinite wisdom of our law makers, it has been thought best to change three times since our organization. We have issued, for two seasons, tags of merit to be attached to certified seed, but a trade-mark of itself carries no value unless the goods to which it is attached have an established reputation. The first season we were surprised to find that certified seed brought but little more than common stock. We can now be glad to notice that there is a change; that certified seed is in good demand over the ordinary. We are aware that some inferior seed got by, but is this surprising when you consider we are in the formation period and as you all know our Commissioner of Agriculture, under whom, in a way, we have to work in order to draw our state stipend, has been changed every two years?

I wish not to be understood as criticising any present or past official, but experience is a valuable teacher and it would seem that some other method of choosing our Commissioner of Agriculture, one that would have a tendency to take it out of politics and establish a longer term of office, is much to be desired.

One of the objects of our association is to stimulate an interest in the growing of pure and productive seed and to

demonstrate to the farmer the great practical advantage which may result from the use of such seed. With this aim in view, you will notice in our premium list, we have offered special premiums for garden seeds, the seed to be accompanied by a specimen of the kind of product the seed produces.

In accordance with the resolution adopted at our last annual meeting, we have established a sale table where samples of certified seed will be shown and orders taken, with the hope that in time it may become customary for visitors to give orders for their next season's seed and know what they may expect to grow.

. In this connection I believe we, as an association, should condemn the wasteful, extravagant method of the Federal Government in the free distribution of seed. We have received enough radish seed in the past two years to supply the Copeland family for the next four generations, and this entirely unsolicited.

Much of the seed is unreliable and its use works greater injury than benefit to the farmer. The law or method by which this distribution is now carried out is desired only by a few Congressmen who imagine they can use it as a magnet to draw some rural votes.

Our aim is to put this association on a sound, systematic basis—in other words, to make it thoroughly reliable and efficient. We want it to mean more to the agriculture of the state and to ourselves than any other association could mean.

If we are to accomplish this it is necessary to exercise the most thoughtful deliberation in its management. It should be *reliable* to the extent that certified seed be furnished in large enough quantities to be of some consequence or to supply the demand, and we should also keep the subject and need of seed improvement constantly before the farmer.

The work of this association is reciprocal and coöperative to a greater extent than any other kindred organization in the state. Reciprocal for the reason the grower of improved seed receives a greater benefit than the one who produced it; coöperative—not as some understand the term, i. e., to combine to beat the other fellow or to put some one out of business,—but to work together for the mutual good of all.

We have done but little propaganda in the way of trying to add to our membership list, because we wished first to put it on a working basis and have something definite to show.

A speaker at our last annual meeting made the statement that the loss sustained by the farmers in the United States from the use of poor seed amounted to more than the losses from all other sources combined, and he would not except even unfavorable weather conditions.

If this is true, and I believe it to be, in accordance with my own observations, you can readily see it would figure an amount almost beyond our comprehension. This gives some idea of the scope of the field in which we are at work and what we aim to accomplish.

Seed improvement should appeal to all as it is an undertaking which helps people to help themselves and there is no possible way of injuring anyone or putting anybody out of business.

Someone has said: "One of the best services a man can render his state is that of finding good seed as it re-inforces and materially increases the results obtained from labor on the land."

With farm products, taken as a whole, selling for higher prices than were ever before known in the world's history, no farmer, considering the high cost of production, can afford to use anything but the best of seed.

Ten per cent increase in the field crops of Maine, which has been shown to be a low estimate of the increase in yield of improved seed, would amount to more than \$4,000,000, annually. And what is more, when we improve the crop, we improve the man, which it not one of the least of our objects.

PRESIDENT COPELAND: The next on the program is the report of the secretary; he does not seem to be present.

DR. WOODS: I move that the report be postponed until the time of the secretary's arrival; and I suggest that this be made a matter of record.

The motion, being duly seconded, was declared a vote.

PRESIDENT COPELAND: We seem to be in about the same condition in regard to the treasurer.

DR. WOODS: I would make the same motion—that the report be postponed until the time of the treasurer's arrival; and that this be made a matter of record.

The motion, being duly seconded, was declared a vote.

On motion, it was

Voted, that the president name a nominating committee and a committee on resolutions; these committees to make their

reports at the subsequent business meeting of the Association on the following morning.

The committees were appointed as follows: Nominating committee, F. S. Adams, Chas. D. Woods, N. H. Rich. Committee on resolutions, W. J. Morse, L. C. Holston, J. H. Blanchard.

PROF. MORSE: I shall not be here tomorrow morning. I have no objection to serving on the committee, if this is satisfactory.

DR. WOODS: There is a matter I would like to bring up at this time; that is, the number composing our executive committee. There seems to be a misunderstanding. I find, upon looking up the records, that we have elected three and four on the executive committee, with the president and secretary, ex officio, of this committee. I would like to have this interpreted so we shall all have a correct understanding of the matter; now, it is being interpreted differently by different people. I will read from the Constitution and By-laws: "Article V, Section 2. There shall be an executive committee of five, elected at the annual meeting for a term of one year. The president and secretary shall be members, ex officio, of this committee."

Now, the question is, whether we have a committee of five or seven.

MR. HOLSTON: Will you read the rest of that article, please?

DR. WOODS: That is all of that section. Oh, you mean, the president and secretary shall be members, ex officio, of this committee? I was one of those who, on the face of that, would interpret it as comprising seven, all together; I have, however, talked with a number of the members of the Association—those who have been members for a longer period than I—and I find, in talking with those who had to do with the framing of the Constitution, that it was undoubtedly their intent that the executive committee should consist of five; that is, the three members who are elected and the president and secretary, ex officio. In other words, they did not intend that five should be elected. While the wording was a little ambiguous, their intent was clear. In order to put the matter before us, I move that this article be interpreted as making the executive committee a committee of five.

Question: Can we change, by a resolution or vote at this meeting, the printed Constitution and By-laws of this Association? The language is plain that there shall be five members of the executive committee elected; also the president and secretary, *ex officio*.

MR. HOLSTON: I was president at the time the Constitution and By-laws were adopted, and have been acquainted with the Association ever since, and the idea has always been, three elected members for the executive committee. There has been no question; our brother is the first one to call our attention to it.

PRESIDENT COPELAND: I think three have always been elected.

MR. HOLSTON: It was the idea to have three. The year I was elected president, somehow four names got on, and they were elected and served for the year. It was an unintentional slip of some kind. The nominating committee put four names in; the matter was not called up and it went through.

DR. WOODS: What is the method of amending the By-laws?

PRESIDENT COPELAND: A two-thirds vote of the members present at the annual meeting.

DR. WOODS: With no previous notice?

PRESIDENT COPELAND: Yes.

DR. WOODS: Since we adopted our Constitution, we have adopted an unwritten policy which, I think, is to the marked advantage of the Association; that is, we have chosen a vice-president who has no duties, with the thought that he would be getting familiar with the workings of the Association and then, after the president has served us for two years, it has become sort of an unwritten law that this vice-president shall become president. It seems to me if we keep up this policy it will be better for the vice-president to be a member of the executive committee, in order that he may be familiar with what the society is trying to do; and it seems desirable to amend that article on the executive committee so that we shall elect two and make the president, vice-president and secretary, *ex officio*. I suggest, if this meets with the approval of those here, that a committee be appointed to draft a change of that section so it can be presented tomorrow morning, to be ratified or rejected.

PRESIDENT COPELAND: That should be referred to a committee on revisions.

DR. WOODS: In order that our records may be free and clear, I withdraw that previous motion.

PRESIDENT COPELAND: We will allow it to be withdrawn, then. It was, therefore,

Voted, that a committee be appointed to revise Article V, Section 2, of the Constitution.

The President appointed the revision committee, as follows: Charles D. Woods, C. M. White, E. A. Rogers.

PRESIDENT COPELAND: We have a communication here, as you know, from the Bangor Chamber of Commerce, which I will read to you:

“BANGOR CHAMBER OF COMMERCE,

“BANGOR, MAINE, December 4, 1916.

“*R. L. Copeland, President:*

“Will you please convey to the Maine Seed Improvement Association, Maine Dairymen's Association and the Maine Live Stock Breeders' Association, a cordial invitation from Bangor Chamber of Commerce to hold the annual meetings of these associations in Bangor in 1917. This organization will hold itself in readiness to assist in every way possible, to make the meeting in Bangor an unqualified success and we trust we will have an early response, notifying us of the acceptance of this invitation.

“Yours very truly,

“BANGOR CHAMBER OF COMMERCE,

“W. A. HENNESSEY, *Secretary.*”

On motion, it was

Voted, that the invitation be referred to the executive committee, with power to act.

REPORT OF SECRETARY OF MAINE SEED IMPROVEMENT
ASSOCIATION.

Mr. President, Officers and Members of the Maine Seed Improvement Association:

I herewith present, for your consideration, a report of the year's work, with such suggestions as may be of help to whoever may have charge of the inspection work the coming season. At the annual meeting a year ago and at a meeting of the executive committee held in Bangor on March 23, last, it seemed to be an almost unanimous opinion that the work of Seed Improvement become more self-sustaining. It was also voted that no seed of any kind should be sent out bearing the tag of the Maine Seed Improvement Association and Department of Agriculture, unless such seed was inspected and passed upon at the time it was being sacked, or after it was placed in the container in which it was to be shipped. It was much easier for your executive committee to vote, as above, than it has been for your secretary to carry it out.

The number of acres entered and applied for entry in 1915 was more than there were funds available to take care of. It thus became a case of either limiting this work to a small amount each year or charging the actual cost of the inspection work to those making entry.

At the executive committee meeting, March 23, I was instructed to figure a schedule of prices for the field and final inspection that would, as nearly as possible, make the work self-sustaining. Taking the record of the work of 1915 as a basis, the following figures were submitted to the members of the executive committee, for their approval: Fifty cents per acre at the time of entry and \$1 per acre for each field inspection, making, in the case of potatoes, a charge for the field work of \$2.50 per acre, and in the case of grain, a charge of \$1.50 per acre. At the final inspection a charge of five cents per barrel sack, or two cents per bushel, was made. These figures were approved by your executive committee and the price for work done the past season has been on the above basis.

I wish to call the attention of all interested to the fact that, while we have an appropriation of \$1,000 per year for our premium list and expenses of holding our annual meeting, we

have no appropriation for field inspection work. Any money used for this purpose has to be taken from other appropriations, usually from Agricultural Statistics. As in other lines of business, so it is in this; collections cannot very well be made for work promised, but must be for work done. Therefore, without some appropriation made especially for this work, funds must be had from some source to start the work. As it is not our desire to have any surplus, or, in other words, to charge the farmers of the state more for doing this work than its actual cost, there are times when there would not be money enough on hand to pay the inspectors and their expenses, even though the amount charged for doing the work might balance at the close of the season's work. Under these conditions the Commissioner of Agriculture very kindly allowed the expenses of two field inspectors to be paid out of the appropriation for Agricultural Statistics, turning back into that fund what money was collected. However, the Commissioner did not deem it wise to adopt this course in the case of the final or shipping inspection. Therefore, your secretary was ordered by the executive committee of the Maine Seed Improvement Association to do certain work, calling for an expenditure of quite a sum, with no available funds to start the work and no assurance that enough could be collected to make good any amount for which he had to become responsible. Yet, to have halted the inspection at this stage was to discredit not only the season's work, but the whole scheme of potato inspection which I believe is today better started here in Maine than in any other state. If you have any criticisms of the way the final inspection work has been carried out I trust that you will make it now, remembering that I had to become personally responsible for the financing of this part of the work.

As was to be expected, with the increased cost of the inspection work, but few entries came into the office, and at one time it looked very much as if no work at all would be done in Aroostook county, the expense of the work looked so great to the growers; and there probably would not have been, had not the growers been solicited and a personal appeal made to some of the leading growers of the county. A part of the soliciting was done by E. S. Russell who later became chief inspector for Aroostook county, and part by your secretary.

A great deal of praise is due these Aroostook men for the interest and help they extended to keep this work going. This is especially true of the following: P. H. Reed, Mr. Saunders and Mr. Smith of the E. L. Cleveland Company, L. A. Bagley, S. H. Collins and The Patten Hardware Company, for growers and dealers; and Fred A. Barton, A. E. Mooers, John McIlwain and M. A. Barrett, as growers. There were entered in Aroostook county (outside of the free grange entries), 352 acres. Of these, 48 were withdrawn and disqualified, leaving 304 acres which passed the second inspection. There were, approximately, 32,000 barrels grown in Aroostook the past season, entitled to the blue tag of the Association and Department of Agriculture.

The work of inspection in Aroostook county for the most part was done by two men, E. S. Russell of Vinalhaven and Ralph M. Whitehouse of Fort Fairfield, at a cost of, approximately, \$900 and there has been collected in the county \$646.75, with \$112 due a total of \$758.75, or a sufficient amount to make the work nearly self-sustaining.

Outside of Aroostook county there has been entered $89\frac{1}{2}$ acres of potatoes and $32\frac{1}{2}$ acres of oats. Owing to the extreme cold and wet of the early part of the season, several fields of corn and other crops, which were intended for certification, were so damaged that they were withdrawn before any inspection work was done. In cases of this kind the entry fee, if paid, was returned to the person making the entry, as it did not seem a square deal to keep any money where the person making the entry had lost his crop by climatic conditions, beyond his control, before the Department had been to any expense for inspection work. In cases where the first inspection was made, the entry fee was kept and the agreed upon fee of \$1 per acre was charged. Where both field inspections were made, although the crop was disqualified on the second inspection, the full fee of \$2.50 per acre was charged. This is bound to cause some dissatisfaction as every farmer feels that he has paid out his good money and got worse than nothing in return by having his crop turned down or disqualified. On the other hand, where the full expense has been incurred to make the inspections, the fees must be collected or a greater burden would be placed on those whose crops did pass all inspections.

Had we a small appropriation there are a certain class of these cases where it might be advisable to remit the fee, especially those fields which are turned down on the second inspection.

To save expense and get the work done as cheaply as possible your secretary did not employ any inspector outside of Aroostook county, but he undertook to do all the inspection work outside of Aroostook. This was enough to keep one man busy, could all of his time have been devoted to it; but with the office work, which had to have more or less attention, the inspection work has in several cases dragged along much more than it should, or is advisable.

Out of the $89\frac{1}{2}$ acres of potatoes entered outside of Aroostook, 13 were disqualified on the first inspection and 15 acres on the second—only $61\frac{1}{2}$ acres passing for certification. In the case of oats, $17\frac{1}{2}$ acres were disqualified and three acres withdrawn on account of rust.

The cost of the work outside of Aroostook county has been approximately \$111.82 and there has been collected \$105.50, with \$127.25 still outstanding. As there were several small amounts collected from the season of 1915, the total amount of collections for field inspections during 1916 were \$816.50, with \$239.75 still due and collectible. This shows that the field work has been nearly self-sustaining. For the final inspection there has been collected \$204.30. Expense bills to December 1 amount to \$193.25, not including the bill for tags which has not as yet come in.

To sum up, there is a far greater demand for certified seed than ever before and your secretary has added the name of several hundred potato growers, who buy northern seed every year, to the list of names on our books. I have had letters from farmers in several states who are trying to grow and sell certified seed potatoes, asking for our Maine method of doing this work, and after receiving the description they have again written, indorsing the plan on which we are working.

So far the shipping inspection has not proven very hard to handle and can be very easily managed in those sections where potatoes are largely grown. My orders to inspectors are to place the tag on each sack or container, personally, and sign each tag in his own hand writing, with ink. I believe this system should be followed rigorously, if the work is to continue and

a number of inspectors are employed, as it makes it easy to trace any poorly sorted or diseased tubers back to the inspector who may be responsible for its bearing the blue tag of our Association.

In closing, I pledge myself to aid in every way, my successor who takes up the work in 1917. I ask that you bear in mind that it takes the better part of the first year to get the work firmly in hand; therefore, do not criticise too harshly my successor in his first year's work, but lend him your support at all times and our certified seed potatoes will stand at the top, from Maine to Texas.

Respectfully submitted,

E. A. ROGERS,

Secretary.

Voted, that the report of the secretary be accepted.

MR. ROGERS: I want to say that a few days ago we got a check from the Bangor Chamber of Commerce, covering the amount given for premiums two years ago. I think these premiums have been sent out; that was the way I left it, so the check could be cashed and the money sent out, and if it has not been sent it will be shortly.

PRESIDENT COPELAND: The members will understand that the Bangor Chamber of Commerce offered several prizes two years ago and through an oversight the money was never paid.

DR. WOODS: I wonder if it would not be a good idea for us to adopt a policy that we will not accept premiums and put them in the schedule until the premiums themselves are put into the hands of the Association. I can see where a person might object to this Association when they won a premium offered under our name and the premium was not awarded for two years. We ought to be protected in some way. I suggest that the cash be turned over to us as a guaranty of good faith at the time the prizes are offered.

PRESIDENT COPELAND: The premiums only called for \$9 instead of the \$25 offered.

DR. WOODS: It is not the question of the amount, but it would protect us as an Association. I think this should be kept in the hands of the executive committee; it should see that, if one should feel called upon to offer a premium, that he give up the price.

MR. ROGERS: When the secretary is writing for premiums, he is, in a sense, a beggar. Now, when I have asked a concern to furnish a premium and it has agreed to it, I would not care to write and ask that the money be sent after it had been promised. I should not want to do it; would you?

PRESIDENT COPELAND: I should think it would be an excellent plan.

MR. ROGERS: So would I; but I should want someone to ask for it.

PRESIDENT COPELAND: I think it should be left to the executive committee.

REPORT OF TREASURER.

Receipts.

1915.		
Dec.	, Cash on hand	\$107 09
	30, E. A. Rogers, secretary.....	29 00
1916.		
Jan.	4, E. A. Rogers, secretary.....	41 00
	Interest Augusta Trust Company,	
	Nov. 1, 1915	3 37
	Interest Augusta Trust Company,	
	Nov. 1, 1916.....	4 81
		<hr/> \$185 27

Expenditures.

1915.		
Dec.	6, F. S. Adams, banquet tickets....	\$2 50
	Guy C. Porter, expense, Ex. Com.	
	meeting, Topsham, Oct. 13, 1915	13 98
	18, R. L. Copeland, expense	10 72
1916.		
Jan.	6, Frank Lowell, expense, Ex. Com.	
	meeting, Topsham, Oct. 13, 1915	1 70
	19, One-third expense banquet tickets	
	and menus, 1915	1 67
Mar.	31, Harry M. Woods, expense, Ex.	
	Com. meeting, Mar. 23, 1916...	70

Apr. 17, L. C. Holston, expense, Ex. Com.			
meeting, Mar. 23, 1916.....	11	21	
June 29, Geo. V. Turgeon, engraving Bell-			
Merrill cup, 1915.....	65	43	13
	<hr/>		
Cash on hand, Dec. 5, 1916....	\$142	14	

Voted, that the report of the treasurer be accepted.

PRESIDENT COPELAND: Can you make an estimate of the outstanding bills? We do not want this to be misleading; we do not want the members to think we are richer than we are.

MR. WHITE: I imagine the outstanding bills would amount approximately to \$15 or \$20.

On motion, it was

Voted, that the treasurer make as accurate an estimate as possible of the outstanding bills and submit it as a supplement to his report, Friday morning.

Question: Have the accounts been audited?

PRESIDENT COPELAND: I am glad the brother brought up this point. The Constitution provides that the president shall either audit the accounts or cause them to be audited. I have gone over them very carefully. It seems to be a little difficult to follow out the program laid down for us. Is there any further business?

MR. ROGERS: I might make a few suggestions for your consideration: At the present time your secretary is officially known as assistant dairy instructor, and he really has no standing, you might say. If the next legislature is going to be in the right frame of mind, I believe this work is now worthy of consideration and that we should try to get a bill through, calling for some official recognition of the one who has charge of this work. This will be a great help to him. Under the present circumstances, if there is need of a man to attend Farmers' Institutes, they call on the assistant dairy instructor and he has to go. I have been perfectly willing to go, but in some cases it has interfered with matters that should have been attended to for this Association. It seems to me the man holding this position should be recognized, just as the other Bureaus are, and it would give him a little more latitude. I think we should have a small appropriation, because, even if the work is self-

sustaining, there are times when it is necessary to draw money from other sources to pay the inspectors. It seems to me it would be a good plan for the executive committee to consider this matter.

PRESIDENT COPELAND: Will you make that a motion:

MR. ROGERS: No. If I were going to make a motion, I should want to have it in writing so I should have it to suit me. We can make a motion, perhaps, tomorrow morning, but I have brought the matter to your attention so you can be thinking about it.

In regard to the certification work; I have letters from New York and Wisconsin and I know they are going to pass laws for future inspection work along the lines we are working on here in Maine. It was because I realized the importance of this work that I became personally responsible for the final inspection. I intended to have brought a letter in regard to the last potatoes that went out last year, in which it was said that the certified seed—especially that from Houlton—stood up so finely it has given us a splendid reputation wherever it went, and I am certain there is a great future for Maine certified seed potatoes, if we can get the work where it should be. I am willing to do all I can to help my successor in his work.

PROF. MORSE: Can you tell me what the Wisconsin people are doing; what they are paying for the seed? I wish I could have the figures. They must be putting in quite a lot of money on this inspection work. They have one man all the time in the work; they have not merely a seed convention, but a potato convention, and I tell you, I look on their advance with considerable apprehension. This is what we must keep up with. We are having more trouble to get help than they are. It seems to me that Maine has enough advantages over Wisconsin, as a potato raising state, to warrant more financial aid from the state.

MR. ROGERS: I am sorry I did not bring the letters. Another interesting thing—or interesting to me, at least; Mr. Reed of Fort Fairfield had the best acreage of anyone, so one of the inspectors told me. A man came from the east shore of Virginia and found out how the work had been done and he wrote and wanted to buy the seed. Mr. Reed said that he had not sold a barrel in New Jersey this year where he sent them last,

for he did not have them to send. He is going to get one or two more farms and is saving three thousand barrels of his best certified seed to plant 500 acres. This is how Mr. Reed is using the inspection work.

PRESIDENT COPELAND: We all know that the very foundation of this whole structure rests on quality. We have been handicapped very much by lack of funds. We need a man of ability to put in his whole time and we have not had it, and how can we expect to maintain this high standard and advance, as we hope to advance, without capital. If you do not think something needs to be done, consult the judges of the exhibit. When the exhibits were put up, I thought they looked fine, but when they began to cut through the potatoes they did not look so well, and it takes time and money to find out these things, so we will know what to put in an exhibit and what to leave out. In regard to the matter of which Mr Rogers spoke. I am glad this was brought up. We should have some title at the Department of Agriculture to give us some standing, and to help us get an appropriation.

MR. WHITE: Can we not have a motion made in this meeting as to our wishes; then we can have it put in writing and refer it to the executive committee of the Federation of Agricultural Associations.

DR. WOODS: I should put it in the hands of the executive committee.

PRESIDENT COPELAND: I would like to inquire if this appropriation which we receive from the legislature, of one thousand dollars, has to be used wholly for the annual meeting, or can it be used for inspection work? Also, if the whole amount is not used, does the amount remaining revert to the state or do we have it?

MR. ROGERS: I understand we can use it for most anything the Association wishes, with the approval of the Commissioner of Agriculture. This meeting will not cost as much in Augusta, for we have to pay our own expenses here, whereas when the meeting is held outside this city, the Department pays traveling expenses, hotel bills, etc.

PRESIDENT COPELAND: I made this inquiry because I knew the first bill was drawn so that we could not use a cent, except for the expenses of the annual meeting. I understood the next

bill made it possible for us to use the money for something else.

MR. HOLSTON: It seems to me, in getting ready for this legislative work, it would be well to instruct our secretary to get in touch with other Seed Improvement Associations in the country and find out what he can from them—perhaps he knows their methods already. They have been taking their ideas from us and perhaps we can get something from them. This is necessarily a coöperative work; when we are helping ourselves, we are indirectly helping a whole lot of people. If Wisconsin and Maine are the only people doing this work, it seems to me it would be the greatest thing for the two states to get together; if they have anything better than we, let us find it out.

MR. LOWELL: A short time ago I sent some potatoes to Wisconsin; since then I have received their books in regard to the Seed Growers' Association. I believe they are a little ahead of us, but we want to keep pace with them. I think the suggestion of Mr. Holston is good.

MR. PORTER: It was my privilege to attend the National Association in Washington. A committee was appointed to work along the lines of forming a standard for certain cases which will suit all the states; or, at least, form a standard to which the states can nearly conform. I believe Maine, Wisconsin, New York and New Jersey are doing seed certification work.

MR. HOLSTON: I had mostly in mind the proper methods to get appropriations for money.

Voted, to adjourn until afternoon at 1.45 o'clock.

Meeting called to order by the President.

The following officers were elected: President, R. L. Cope-land; Vice-president, G. C. Porter; Secretary, E. A. Rogers; Treasurer, C. M. White; Executive Committee, Frank Lowell, H. M. Woods, A. E. Hodges; Member of Experiment Station Council, W. G. Hunton; Delegates to Federation of Agricultural Organizations, L. C. Holston, W. G. Hunton; Visitor to College of Agriculture, N. H. Rich.

MR. WHITE: You asked yesterday for a supplementary report from the Treasurer. I have been trying to get all the

bills together and I think I have them about all in. I will read them :

R. L. Copeland	\$12.40
A. E. Hodges	1.75
Frank Lowell (estimated)	5.00
Banquet expenses	7.88

The banquet expenses this year are a little heavier than usual. There is a bill for inspection that is still under discussion, but Mr. Rogers tells me the thousand dollars has not been all used and we may be able to take it out of that. The bill for inspection is \$32.00. Deducting all these bills from the amount reported yesterday—\$142.14—leaves \$93.11 in the treasury.

Voted, that the Secretary be instructed to send out a notice to each member of the Association not in attendance, asking them to pay arrears in their membership fees.

The report of the Committee on Resolutions was called for:

REPORT OF COMMITTEE ON RESOLUTIONS.

Resolved, That it is the opinion of this association that the assistant dairy instructor should be relieved of the work of seed inspection and certification, also that provision should be made and sufficient appropriation made therefor, so that the seed inspection and certification could be carried on by an official appointed for this purpose in the office of the Commissioner of Agriculture.

Resolved, That in our opinion the office of Commissioner of Agriculture should be removed from politics and that the term of office be lengthened. The executive committee of this association is hereby directed to take up this matter with the executive committees of similar organizations.

Resolved, That this association herewith endorses the Agricultural Extension work, conducted under the Smith-Lever act, and recommend the extension of the County Agent work into other counties in the state, as rapidly as possible.

Resolved, That this association highly approves of the joint meeting of the Maine Live Stock Breeders' and Maine Dairy-

men's Associations, with our own, and hereby instructs our executive committee to arrange for such a meeting in 1917, if practicable.

Resolved, That this association tender its thanks to all exhibitors for premiums or for educational purposes, to the State Department of Agriculture, the Augusta City Government and Board of Trade for courtesies extended; those who so generously donated special premiums, the press for their reports, and the railroads for reduced fares.

Respectfully submitted,

W. J. MORSE,
L. C. HOLSTON,
J. H. BLANCHARD,
Committee.

Voted, that the report of the committee on resolutions be accepted and the recommendations adopted.

MR. HOLSTON: The question came up in the exhibits this year in regard to diseases. Everyone knows there is a good deal of disease and it seems to me it is time we took a stand on this question. Some think that every exhibit that has any disease in it should be cut out. It seems to me that, as an Association, we have no right to recognize any disease as coming under the premium list. I do not see how we can get ahead any other way. This is a suggestion, but not a motion.

MR. ROGERS: If Mr. Holston will allow me, I really think he has made it a bit strong. I would suggest that he make it any disease running above a certain standard which we have set. We have a standard of five per cent in the case of *Rhizoctonia* in order for potatoes to pass, and anything between 95 per cent and 100 per cent in the case of net-necrosis. Personally, I consider it one of the most serious things we have. Just a slight amount of the net-necrosis does not hurt the potatoes that are going South; on the other hand, it is hard to discriminate between one who is going to ship South and one who is going to plant and sell more seed. I am certain this disease will live over one year in the soil. I do not believe we would get more than five bushels next year if we barred every diseased potato.

MR. HOLSTON: I spoke off-hand; I meant to cut off everything for exhibition purposes that would not pass our inspection. We cannot leave ourselves open to criticism.

DR. WOODS: Make a motion that the executive committee take this under consideration, giving due notice when sending out the premium lists.

Voted, that the matter of diseases be referred to the executive committee and that proper notice be given in regard to same when sending out premium lists.

MR. ROGERS: It seems to me, if a large lot of potatoes are entered and they have diseases that do not show until they are cut open by the judges, these exhibits should be removed from the hall. I have seen potatoes that have been thrown out, stay there all through the show. They should be removed, at least, from the exhibition room.

MR. HOLSTON: I think we have covered that.

PRESIDENT COPELAND: Yes. This is an educational movement, and I do not know of anything that will educate the people more than to see an exhibit, that looked beautiful before they were cut, show up in this way. Next year, people are not going to waste their time by bringing in such products.

MR. ROGERS: Couldn't they be removed to the Station table where they are exhibiting potato diseases?

PRESIDENT COPELAND: If an exhibit has been entered, we have no right to disturb it.

DR. MERRILL: I wanted to carry the suggestion further, when Mr. Rogers went part way. I understand these exhibits are disqualified by the judges. When an exhibit is once made, this exhibit ought properly to remain, but it ought to be marked "disqualified," if allowed to remain, and why it is disqualified.

PRESIDENT COPELAND: It is understood that the exhibitors should be notified.

DR. MERRILL: If the exhibit is not marked, the general public might not understand about it; to the layman they look like good potatoes.

On motion, it was

Voted, that the discussion from the time Dr. Merrill spoke until this motion, be stricken from the records.

The committee on the revision of the Constitution reported as follows :

Amend Article V, Section 2, so it will read as follows :

“There shall be an executive committee of five, consisting of the president, vice-president and secretary and two members, elected at the annual meeting for a term of one year.”

This revision was adopted by a two-thirds vote of the fourteen members present.

Voted, to extend the thanks of the Association to the judges of the exhibits shown in connection with this meeting.

ADDRESSES DELIVERED AT MEETINGS OF MAINE DAIRYMEN'S ASSOCIATION AND MAINE SEED IMPROVEMENT ASSOCIATION

SOME COW TESTING ASSOCIATION RECORDS
AND WHAT THEY PROVE, REGARDING COST OF
PRODUCTION OF MILK.

L. E. MCINTIRE, East Waterford.

(Stenographic Report.)

In connection with the Cow Test Association records, they have proven a good many things. They have proven that a great many cows are not profitable; that is one of the things we have learned. A great many cows in Maine, in my judgment—more than one-half—have been kept at a loss. This is, perhaps, due to the high prices of feed and the extra cost of labor. If this is true, something is radically wrong. It is true that our College of Agriculture, our Department of Agriculture, the Maine Dairymen's Association and individuals all over the state have done all in their power to help, prompt and encourage the building up of dairying. What is the result? We have hardly held our own. What is the trouble? It is lack of profit in the business. You make dairying profitable and the farmers will take hold of it; but without profit, no one can do it and live unless he has another line of business to help him out. I do not want to say anything against any of you; I can see some of my good creamery friends here; I want to see them prosper, but I want to see the farmer's end of it prosper. I want to see the farmer get a living by dairying but he has not done it; he is not doing it today. That is the condition, and if this is true, certainly we all ought to work together to better this condition. We need the help of our creamery men; we need the help of anybody who will better

conditions, but these are facts, gentlemen. This is why it is such a struggle to keep our dairies together—why it is a struggle to keep our Association together. Now, I am not speaking in a spirit of criticism; no one thinks more of the Dairy Association than I, because, as I said in the beginning, I have every reason to wish for success. I have a son who has devoted nearly twelve years of his life to farming and dairying; it is all we know how to do; can't you see I want to see it prosper?

These Cow Test Association records have brought out some of these facts: In order to exist at all, we must have a better class of stock. I have figures, I think, that will convince anyone that even a herd of 8,000 pound cows cannot make a profit. How many of you have herds of 8,000 pound cows? I have, and there are others present who have, but they are not plenty; it is the exception and not the rule.

In Mr. Adams' report I noticed it was spoken of that Mr. Cummings and myself were at the Interstate Commerce hearing. I was there; I am going to tell how the records happened to be presented at the hearing. I went to Boston, never thinking it was going to take several weeks; I had appointments for the next week and I was anxious to get home. Mr. Cummings and I went to the Federal Examiner and asked if I could not present my testimony and go home; he did not think I could that day for, as you will probably remember, the railroad men had their hearing the first of any. However, I was told to go over to the hotel that evening. I went, and I took the records with me and in three minutes after it was seen just what they were, I was told I could go on the stand the next afternoon so I could go home. When the time came for me to be called, I produced the records. I was asked if I was a shipper, and I told them I was not. I said, "I have nothing against the railroads; I am simply here to show from these records what it costs to produce a quart of milk." I am not ashamed to tell you that one of the railroad lawyers told me afterwards that I was the first farmer he had seen at the hearing who did not have a slam at somebody.

Now, what did they think of the records? I was asked to tell my story in my own way. They knew I had a modern cow barn. John Orcutt asked me: "Does not the increased cost of your new barn enter into the cost of the milk?" (I testified

my milk costs me four cents in my dairy.) I said, "Why do all of the great manufacturing concerns build the most modern plants and equip them with the most modern machinery? Simply to lessen the cost of production," and that is true. I can produce milk cheaper in my new barn than I ever could before. One man asked that the records might be left and that an expert be put on them to go through them and make more of a summary than I had made for one year, showing the exact cost of feed, and so on, where I had got the four cents a quart. I said, "Surely; I am glad to leave the records," and they were left with the expert accountant. I had a summary sent me, and I am going to tell you what my milk for eight years brought me a quart: reckoning thirty cents a hundred, practically three cents a quart—that is what my milk brought me and I fared as well as anyone. There is a particular friend of mine who has a creamery in the good town of Waterford; no one has ever found fault with the tests or with anything that I know of; I am sending milk there today and am perfectly satisfied, but that does not make it profitable to my business to do it. If it were not for the gradual improvement of my farm and of my dairy cattle, I would not be able to be in the business at all. There is not a man in the state who can buy feed at the present prices and sell at that profit and continue his business a year unless he has some other source of income.

The question now comes, how to overcome this? We have no time to devise means here. Your President has started you on the right track when he says it means "organization." Most of you know that the dairy business is on the point of being put out of existence and we are all interested alike; we want the business to go and the world wants the business to go. Forty-four carloads of cattle went out of New York State recently upon the market, simply because it was not worth while to milk them; that is the condition outside of Maine. It is not possible to get back into dairying in a moment; after you once get out of cows, you are out for a long time, so it is necessary that steps be taken to make it profitable, in order that people can stay in the business. The trend of the whole thing now is to get away from the farm; get away from the steady job of taking care of the cows for 365 days in the year. People do not want to do it under the present conditions. I could tell you

of one of my friends who would say his cows pay; how do they pay? There is not one man in fifty who is physically able to do what he has done, and the other forty-nine wouldn't if they could. This man has got up in the morning and had twelve cows to milk; then he had hogs to feed and his other stock to attend to; he would go out into the woods and cut wood, load it and haul it to market; then back by four or five in the afternoon to do his milking and so on again, and any time before ten o'clock at night, if you call him on the telephone, they will tell you that he has not come in from the barn yet. If that man could have ten cents an hour for the extra time he has worked, he would be well off today. Most of us will not work like that.

Now, I believe I was going to tell you some facts you would not like to hear. A bright young man came into my neighborhood; he was a college graduate, a good care taker; he started in with pure bred cows and what was the result? He could not get enough from these cows so he could live, and he had to go. Isn't that a bad state of affairs? It is not encouraging to young men, certainly. I have a boy struggling along with me, trying to make things go and I want to see conditions better for him and for the other boys of Maine, and some day we are going to bring it about. I was accused the other day of trying to start a milk trust. Most of our farmers have been a little sore on trusts; we do not like trusts, but every big business in this country today is covered in some way like this and we farmers, if we are going to exist, have got to come into line on the same plan of coöperation work or we are going to be down and out. We want the help of the creameries and we ought to have it in order to help them; they have an enormous sum of money invested in creameries in Maine, and without any dairy business these investments are worthless, so they are interested as much as we are.

I think you will all agree with me that Cow Test Association records are valuable. My records have proved to be more valuable to me and to people outside than I had any idea when I had them made. When Dr. Merrill came to my town it was the first I knew about cow test work. I did not think much of it at first, but before he talked half an hour, I thought I could benefit my condition; that was all I thought of then and since then I hope I have broadened out a bit.

There is one thing more I want to speak of, and that is the misleading part of these records. When we began making these records, it was for our special benefit; it was about the first coöperative step of the farmers that I know of. The records were to be made so the Department should have a copy, the individual a copy and one copy was to be filed with the Association records. When the reports were first printed it was all right, if they had been started right; but they soon came out, showing the feed cost and a great big lot of profit; you can see what that meant in summer time, for instance, when there is not so much expense. Most of you know that the feed cost is practically one-half the expense of producing milk.

Question: Do you mean just the grain, or everything?

MR. MCINTIRE: I include everything that enters into the feed; that is practically one-half the expense when you go in and charge what rightfully belongs to the individual cow, the same as any business man would charge in his business for every item. So you see how misleading those reports were. It went out to the public; the city people said, "Look at these farmers; most all profit." This is absolutely wrong; it is misleading. The Waterford Cow Test Association refused to have the records published in that way. Everything seemed to work to keep prices down. I notice in some Vermont records they show the feed cost for an individual cow to be \$45.76 for a year; who believes that? You know it is not right. Perhaps, in order to beat some neighbor, the man has not charged up what rightfully should be charged. You can cheat in these records. You can cheat in most anything, but if the records are intended, when rightfully made, to show us what we are doing, it is a strange sort of a man who will cheat himself by not charging up what he should.

One thing more in connection with the records. The dairy-men of Maine, in general, have been pretty willing to comply with the Board of Health in their demands to make cleaner and better milk; this is right and just. There is no man but that can make clean milk, and we are willing to comply with that at a greater amount of work and cost. As several will remember, two years ago our Commissioner, brother Bradford and others tried to pass an inspection bill through the legisla-

ture. We tried to pass a bill that would leave that inspection in the hands of our Department of Agriculture, so that Maine would have something to say about what should be done with Maine people and Maine products. What happened? This happened; when the time came I was absolutely alone in favor of that measure. Everybody scared to death to have that power in your own Department of Agriculture; rather trust it to the Board of Health of the state. I hope some one will have interest enough in the next legislature to pass some inspection law so the State of Maine will have something to say about it.

Question: How much does it cost a day to feed a cow at this time of year?

MR. MCINTIRE: I have cows that cost me around \$90 a year to feed; I do not know that I have it reckoned for the day, here. Of course, the cost would vary with the prices, and upon the condition of the cow.

Question: When you are reckoning your cost of hay and silage, do you reckon them at the highest market price?

MR. MCINTIRE: When you are selling your hay and silage, you would reckon the cost at the price they would bring you.

MR. FULLER: And you are selling your labor, also, at a good market price?

MR. MCINTIRE: I am selling it at ten cents a day for each cow; can you feed her, and groom her and do all that is necessary for less than \$36.50 a year?

MR. MCEDEWARDS: What do you offer as a suggestion to bring down the cost of feed?

MR. MCINTIRE: Kill off some of these speculators (this does not mean literally, with a gun, but in a business way). When it comes to making feed dollars and dollars more than it ought to be, it is radically wrong, and you are coming right back to the question, what are we going to do if we are to live? We are going to meet these terms in the same way in which they are put up to us. We will cut down the dairy business until it is made profitable. I keep twenty cows, if it is not profitable.

MR. BLANCHARD: That card on the wall shows that they have been cutting down the cows for the last ten years.

MR. CLOUGH: Does your feed go down there at what it cost you in the market?

MR. MCINTIRE: Perhaps my cows have this advantage: I have 25 tons of feed in my storehouse, and in my Association record my feed is given at the price it cost me when I got it.

MR. CLOUGH: I have fed my cows hay that I could have loaded at my barn and sold for \$18 a ton, and the price the figures were made up from was \$12.

MR. MCEDEWARDS: A year ago your milk cost you four cents a quart?

MR. MCINTIRE: That was a year ago.

MR. MCEDEWARDS: We are giving five and six-eighth cents a quart delivered at the creamery.

PRESIDENT TUCKER: How does the increase in price compare with the increased cost of production?

MR. MCINTIRE: I am not prepared to give you the figures.

MR. CLOUGH: Is that increase in price the result of decrease in production?

MR. MCINTIRE: Mr. Bradford can tell you better than I can.

MR. CLOUGH: Do you think the increase in the price of butter is equal to the increase in grain?

MR. MCINTIRE: No, I do not think so. I thank you, gentlemen, for bearing with me.

PRESIDENT TUCKER: I think this has been one of the most interesting discussions we have ever had at a dairy meeting. I have enjoyed it because we all know it rings true; that these are the actual conditions, and those in the business appreciate it.

MR. ADAMS: I would like to say a word for the benefit of the young men. Within a few weeks the price of dairy products has increased by leaps and bounds and, in my particular dairy, very much faster than the price of grains. I am getting now ninety cents a hundred for cream and milk and forty cents a pound for butter-fat, and I guess they are going to increase it more. I am getting six cents a quart for milk on the farm. I am not arguing that the farmers are getting any too much, but I do not want to see these young men stop dairying. The pendulum swings one way and then the other. I predict a bright future for the dairymen of Maine. The project of advertising milk as a food has been undertaken and we ought to help it along. Why, I never felt so much courage about the dairy business in all my life. I know grain is mighty high, but I also know Mr. Bradford is paying more.

MR. MCINTIRE: May I say a word? This is not getting after anyone, it is just the conditions. You listened to Mr. Adams in his report, and to our President in his address, and we got a little idea why we are having an increase; it is because things are going a little different. I want to call your attention to this fact: For years, in any town or city, if an effort has been made to raise the price of milk one cent a quart there would be the greatest howl you ever heard and yet, these same people will go to the market and pay three or four times as much for anything they want there. It is necessary for us to get out and make our wants known. People can pay a cent more for milk as well as for anything else; they do not need it all for the moving pictures.

DR. WOODS: There is not one person in twenty-five who regards milk as a food and knows its nutritive value. More than twenty years ago the Experiment Station made experiments and showed facts that have never been followed up by the dairymen. I issued a bulletin in which it was shown that the free use of milk in a dietary which we tried out at the University, without the students knowing it at all, resulted in a reduction in the cost of the dietary. The protein in beef was replaced in milk; milk has a wonderful nutritive value, and the reason a woman resents paying more for milk is, that she does not believe the milk has nutritive value while the beef has. If you have an oyster stew made of oysters and skim-milk, the nutritive value is more dependent upon the skim-milk than upon the oysters. The only way we can bring about the desired end is to educate the public up to the idea that when they buy milk they are not buying drink but are buying food, and that is the greatest place to make our attack today. The consumer must understand that when he is buying milk he has bought food and not something like water.

MR. GUPTILL: I certainly think everybody ought to hear what is going on now, for it is very interesting. I want to say a word. There is an organization known as "The Packers," who are interested in having meat used in place of milk; interested in having oleo used in place of butter, and you will hear the continual cry of, "Dirty milk." Now nobody wants to eat dirty milk, but I don't believe it ever killed anyone. I was brought up on a farm and I presume I drank milk that had

500,000 cubic centimeters of bacteria, and I lived through it and I think the bones of those little bacteria did me good; but dirty milk is unpleasant to the palate if it doesn't kill anyone. I, for one, am tired of this continual harping of the Board of Health. You will see from that card what progress we are making in our dairy interests, and then they tell what beautiful chances there are for agriculture down here. Every Board of Health is calling for better milk. All right; but we ought to come back to the source from which that arises. You have got to understand where the animus is. They are trying to sell more meat and more oleo. I recommend that you study the exact situation of Boards of Health in Maine; what they are for and what they should do, and carry that matter to the legislature.

MR. HOLSTON: I want to make this statement, that I agree with everything Mr. McIntire has said. I believe that ninety per cent of the dairymen here, if they know the facts of the case and figure out to find the cost of their product, will come to the same conclusion to which Mr. McIntire has come. I think there are others who will bear out my statement, and it seems to me it is time the dairymen of Maine should be getting together and doing something. We are now getting stingy prices, even if they are some better than before.

Now, I want to bring up the case of a man we ran across the other day who is sending his cream to the creamery. He told me that a collector comes to his house; that he is never less than two days on the road, and that the price paid for delivering the butter-fat is seven cents a pound for every pound he sends to the creamery; so, instead of getting the forty-one cents that the man on the railroad is getting, he is cut down to thirty-four cents. I do not know how many of you are situated like that, but if the fellows who are living on the railroads are not getting by, what is the man going to do who has to pay seven cents more for a long haul? I think that card on the wall will tell you what they are going to do and what they are doing.

PRESIDENT TUCKER: This is certainly a vital question to us all.

MERITS OF BUYING MILK ON THE BUTTER-FAT AND PER CWT. BASIS VERSUS THE QUART BASIS.

E. L. BRADFORD, AUBURN.

This discussion relates principally to the dealer buying of his patrons and incidentally to the consumer buying of the dealer. I suppose most of the small milk dealers ("milk men") buy their requirements by the quart, in addition to what they raise themselves. The larger dealers ("shippers") buy in this state in the following ways:

1st. A comparatively small amount of milk, west of Portland, is bought for the Massachusetts market by the can or, what is the same thing, by the quart. Whatever the test, it is all the same, so long as it clears the law in the market where sold.

2nd. In another section of the state the value is based on a price per hundred pounds of milk of a certain test, with two cents a "point" or "tenth" added or subtracted as the test varies from the given standard. In still other sections practically the same method prevails, except that a price per 100 pounds of milk is established for a minimum test of 3 per cent and then 3 cents a "point" is added as the test goes up from 3 per cent. In some cases this 3 cents a tenth stops at 4.2 per cent. That is to say, the farmer gets no more for 100 pounds of 4.3 per cent or 5 per cent milk than he would for 4.2 per cent milk.

3rd. More generally, however, in the State of Maine the practice is to set a price per 100 pounds of milk, including the fat; and an additional price per pound of fat.

It is quite true that the fat gets paid for twice under this plan—once by the pound and once by the one hundred pounds. But this works no injustice, and saves the cost of casting out the fat in order to pay the per cwt. price for the skim-milk only, instead of for the total weight of the milk. It is well to note in this connection that in some sections the dealer *does* cast out the fat before computing the per cwt. price.

Thus there are in Maine three general methods of buying milk. The second and third methods differ mainly in that the

second method fixes the price of fat the same for all the year round—20 cents a pound in one case and 30 cents in the other. The third method sets a value for fat more nearly consistent with its current value for butter making, or for use in the sweet cream trade. It may be explained here that a 2 cent a “point” or a “tenth” means 2 cents for a tenth of a pound of fat, or 20 cents for one pound of butter-fat. Three cents a point means 30 cents for one pound of fat.

To illustrate the difference in results from figuring by the different methods, let us take three examples:

1. In our first example let us suppose that by whichever method bought 100 pounds of 4 per cent milk brings \$2.40. Under this assumption the price per cwt.:

With no allowance for fat would be	\$2.40
With 20 cents a pound allowed for fat	1.60
With 30 cents allowed for fat.....	1.20
With 40 cents allowed for fat80

2. Example No. 2 will deal with 100 pounds of 3.4 per cent milk, and it is found that under the above prices we get:

With no allowance for fat and \$2.40 per cwt.....	\$2.40
With 20 cents allowance for fat and \$1.60 per cwt.	2.28
With 30 cents allowance for fat and 1.20 per cwt.	2.22
With 40 cents allowance for fat and .80 per cwt.	2.16

3. For Example No. 3, take 100 pounds of 4.6 per cent milk and we have:

With no allowance for fat and \$2.40 per cwt.....	\$2.40
With 20 cents allowance for fat and \$1.60 per cwt.	2.52
With 30 cents allowance for fat and 1.20 per cwt.	2.58
With 40 cents allowance for fat and .80 per cwt.	2.64

Briefly stated, the difference in price of 100 pounds of 4.6 per cent milk and 100 pounds of 3.4 per cent milk when figured at:

40 cents for fat and \$.80 per cwt. is	48 cents
30 cents for fat and 1.20 per cwt. is	36 cents
20 cents for fat and 1.60 per cwt. is	24 cents
Per can or quart rate it is	0 cents

Now there are 1.2 pounds more fat in 100 pounds of 4.6 per cent milk than there are in 100 pounds of 3.4 per cent milk. Butter-fat is easily worth 40 cents a pound at the present time

for butter making. One hundred pounds of butter-fat will make 117 or 118 pounds of butter and the increase in weight will pay the expense, and more. So it cannot be denied that the fat in the richer milk is at the present time worth 48 cents more than the fat in the 100 pounds of 3.4 per cent milk. And it is well known that the solids, not fat, are in greater abundance in milk high in fat than in milk of low test, although other solids do not increase in equal ratio with the fat. But there is one constituent that prevails to a greater extent in thin milk than in rich milk. It is good stuff, too, and if used more abundantly, to the exclusion of certain substitutes, there are people who would be better off. I am speaking of water. Perhaps some humane motive of this sort actuates the Massachusetts and New York dealers to pay the same for water, per quart, that they pay for butter-fat and other milk solids. They may be ministering angels—in disguise, instead of the crafty dollar seekers they are popularly represented to be. Viewed as a thirst quencher, rather than as a food product, the thin milk certainly has merit. I will confess I never thought of the matter in this light before, so I am getting some good out of this paper, if nobody else does. When the Commissioner assigned me this job there was a sort of tacit understanding that the only emolument would be my expenses—to be paid by myself. And that was right, too.

CREAM.

I think there are two ways in this state of buying cream.

1. Paying a price per pound of fat, with no allowance for the skim.

2. Paying a price per pound for fat and a price per cwt.—same as in buying milk. In this case some dealers cast out the fat before computing the per cwt.; others do not, but pay for the fat by the cwt., in addition to paying for it by the pound.

Now, in all these methods of buying, there is one and only one that is equally applicable to the purchase of milk and cream; and the same method is admirably adapted for the dealer's use in making an equitable price-list for the sale of skim-milk, whole milk, or cream, of any grade, to the consumers. No one would think of buying cream upon a plan of

adjusting higher or lower per cents, at 20 cents a pound of fat, or even at 30 cents a pound of fat. The most practical way for a dealer is to adjust the price of fat, both to his producers and consumers, upon its marketable value in the milk or cream he is selling—modified more or less at times by the price of butter. The price of skim-milk should be governed in a similar manner. And it is easy to see that one dealer may find skim-milk of more value to him than it is to another dealer. This will depend upon the dealer's market for fresh skim, his facilities for transportation to that market, its value for manufacture into casein, condensed skim or skim powder. Some of these items depend upon the world's markets, but they are all more or less interdependent, and one cannot change greatly without affecting the rest.

Realizing the wearisomeness of this subject, or at least my exposition of it, I will leave it here, in the hope that you understand what I think is the best method of making prices on milk and cream. I wish this subject might be discussed somewhat today, and I will try to answer any question upon it.

But do not applaud quite yet. I have a side issue or two that I want to introduce.

It is of vital importance that a dealer should know how to handle his product and how his patrons should handle it, so that it may be put upon the market in condition pleasing to the customers and satisfactory to the health authorities. Such handling is necessary to gaining and holding the more desirable class of customers obtaining good prices, and thus being able to pay good prices.

So when a dealer asks his patrons to do this or that thing the chances are that the dealer knows what is needed and has the ultimate good of his patrons in view. I am not complaining of the producers. I am simply asking all patrons to heed what their dealer says, and work cheerfully for the common good of the business. Do not expect consumers to come up and say, "Here is some money, now give us better milk." But we should produce the good milk first—get our reputation first and then by firm and tactful methods, secure a deserving price. As a matter of fact that is just what State of Maine producers have been doing in the past few years, and Maine milk stands well today. But there is plenty of room for improvement, and

we should accelerate our pace, that no one may go by us. In the long run the most impressive advertising consists in good stuff, good service and fair dealing. With a reputation achieved for these things, a little tact and courage will bring adequate prices. Above all things, do not run down your own business.

One more subject, briefly, and I will be through. It is a fact that the milk rates which went into effect October 1 of this year make it easier for a producer, or a group of producers, to market their milk independently of the large dealers. That was supposed to be a great blessing. At the present shortage of milk and, consequent, high prices, there is a great scramble by small dealers for a supply. We know of cases where the small dealer has come to our patrons, that were not posted on what prices we could pay, and have gotten away their milk, for the time being. There is no question but what the most of these producers will come back to us, when milk is more plentiful again. Now, think what effect it has on our business to have patrons drop out when most needed and come back when not needed at all. It means a damage to the business—both when they go and when they come back. Damage to the business means damage to those patrons who stand by at all times. This is too obvious to require explanation. The outcome of it is that we shall have to be more strict in the future to protect the interests of our constant patrons against those who are disposed to trade here and there, regardless of the effect on their brother patrons. By the same token we shall try to keep tabs on our customers, and give preference to those who take their supply of us at all times, selling to others at such times and prices as will be most profitable to our concern.

Thus any large concern will have to be more than ever on the alert to protect itself and its patrons from imposition on the part of producers and customers who would use it only as a convenience.

PRESIDENT TUCKER: The discussion on this subject was to have been opened by Brother Hamlin, but he assures he has never bought milk and therefore is not qualified to speak on this question. He has asked to be excused so I will now call upon Brother Harris.

MR. HARRIS: I am not in a position to discuss this matter only in a one-sided way. I think it is a fair method to buy on the butter-fat basis and also by the hundred weight basis, especially if you want milk or thick cream, and if you are looking for water, as has been brought out. I have heard of dairy-men wanting to sell their milk to creameries by the gallon, but it seems to me it must be a very unsatisfactory method. It would be like going back to the inch arrangement, or nearly so. I am sure I have learned a good deal from Brother Bradford's address, but I know our patrons, and I think it is a pretty good idea—when they are satisfied and are having a fair deal—to let well enough alone. As I was saying, if we were looking for thinner cream or more milk, the idea of the per hundred weight would work out nicely, but with a variation in cream of from 18 to 30 per cent it would not be satisfactory; it would be worth more if we had a market for skim-milk. If the farmer is paid on the butter-fat basis, he is induced to keep his milk on the farm and the skim-milk is a valuable by-product. If all the skim-milk raised in Maine were sent to Massachusetts, I don't know what the next generation of cows would be; the calves need the skim-milk, and the pigs ought to have it. I feel that I am incompetent to discuss the matter further.

MR. LOWELL: The gentleman just said that we need the skim-milk to feed the calves; that is correct; I don't think there is anything quite equal to milk to make our calves grow, and if we want good sized cattle we want them to grow from the first right along all the time. I would ask the gentleman what he would consider the comparative value between cream, milk and whole milk in feeding calves?

MR. HARRIS: I am not a stock raiser.

PRESIDENT TUCKER: I think that the greatest drawback to the system that Brother Bradford has instituted is that it has a tendency to draw the skim-milk off the farm.

MR. BRADFORD: I just want to say in addition to what has been said that as you know, you always have the standing offer of sweet, pure, Pasteurized skim-milk at five cents less than the creamery has paid the farmer per hundred for it. In a creamery of a certain concern, the farmer can buy skim-milk, 10 gallons at a time, for five cents less than he is paid per hundred weight.

MR. HOLSTON: I have heard a good deal of criticism about the delivery three times a week of cream in order to get the per cwt. price. I presume they have a reason for that, and I would like to ask Mr. Bradford what that reason is?

MR. BRADFORD: Now, at this season of the year, cream or milk is liable to get bitter if it gets too old. There is a lot of bacteria that grows in milk when it is old and, even if it does not sour, think what it has to go through before the consumer eats it.

Question: Will we get any more pay for its being collected three times a week?

MR. BRADFORD: Well, I think we shall get such a hold on the consumer that we will give you as good a price as anyone; at least, you will get your pay for it.

THE MYSTERIES OF OLEO AND ITS REGULATION.

HON. GEORGE L. FLANDERS, Counsel for the Department of Agriculture, New York State, Albany, N. Y.

For the purpose of comparison, before discussing the oleo-margarine question, we will take a partial bird's-eye view of the dairy situation as shown by the census of 1900 to 1910.

The following states show a decrease in dairy cows, according to the last census from 1900 to 1910:

1900	1910		Decrease
126,434	122,853	Connecticut	3,581 cows
1,251	857	District of Columbia	394
1,423,648	1,406,792	Iowa	17,856
173,592	156,819	Maine	16,773
184,562	171,936	Massachusetts	12,626
115,036	101,278	New Hampshire	13,758
157,407	154,418	New Jersey	2,989
943,773	933,640	Pennsylvania	10,133
23,660	23,329	Rhode Island	331
270,194	265,483	Vermont	4,711
			<hr/>
			83,152

The following states show an increase in milch cows from 1900 to 1910 namely: 39 and 2 territories.

State	1900	1910	Increase
Alabama	279,263	391,536	112,273
Alaska	13	231	218
Arizona	17,965	28,862	10,897
Arkansas	312,577	425,793	113,216
California	307,245	467,332	160,087
Colorado	100,116	144,734	44,618
Delaware	32,591	35,708	3,117
Florida	78,830	116,041	37,211
Georgia	276,024	405,710	129,686
Hawaii	4,028	6,861	2,833
Idaho	51,929	86,299	34,370
Illinois	1,007,664	1,050,223	42,559
Indiana	574,276	633,591	59,315
Kansas	676,456	736,107	59,651
Kentucky	364,025	409,834	45,809
Louisiana	184,815	279,097	94,282
Maryland	147,284	166,859	19,675
Michigan	563,905	767,083	203,178
Minnesota	753,632	1,085,388	331,756
Mississippi	299,318	429,587	130,269
Missouri	765,386	856,430	91,044
Montana	45,036	77,527	32,491
Nebraska	512,544	613,952	101,408
Nevada	13,606	17,084	3,478
New Mexico	16,775	51,451	34,676
New York	1,501,608	1,509,594	7,986
North Carolina	233,178	308,914	75,736
North Dakota	125,503	259,173	133,670
Ohio	818,239	905,125	86,886
Oklahoma	165,852	530,796	364,944
Oregon	122,447	172,550	50,103
South Carolina	126,684	180,842	54,158
South Dakota	270,634	369,764	99,130
Tennessee	321,676	397,104	75,428
Texas	861,023	1,013,867	152,844
Utah	65,905	75,810	9,905

State	1900	1910	Increase
Virginia	281,876	356,284	74,408
Washington	107,232	186,233	79,001
West Virginia	205,601	239,539	33,938
Wisconsin	998,397	1,473,505	475,108
Wyoming	18,272	32,699	14,427
			<hr/> 3,685,789

From the above it would seem that in the nine states and District of Columbia the number of dairy cows has decreased from 1900 to 1910 and the decrease in the aggregate is 83,152, and there has been an increase in the thirty-nine states and two territories, as above set forth, in the aggregate of 3,685,789, showing a total increase of 3,602,637 cows in the United States from 1900 to 1910.

The amount of butter manufactured in the United States, as shown by the census of 1900 to 1910, is as follows:

1900	1910	Increase
1,491,752,602	1,619,415,263	127,662,661 lbs.

From computations made, I find that in the year 1850 there was one dairy cow to 3.63 persons, and that there were 13.51 pounds of butter made for each person. In 1860 there were 3.66 persons to one dairy cow, and there were 14.61 pounds of butter made per capita. In 1870 there were 4.31 persons per dairy cow and there were 13.33 pounds of butter made per capita. In 1880 there were 4.03 persons to one dairy cow, and there were 16.08 pounds of butter made per capita. In 1890 there were 3.81 persons to one dairy cow, and there were made 19.11 pounds of butter per capita. In 1900 there were 4.45 persons to one dairy cow, and there were made 19.55 pounds of butter per capita. In 1910 there were 4.45 persons to one dairy cow, and there were made 17.67 pounds of butter per capita.

Thus it would seem that, while the population has increased since 1850 from 3.63 persons to 4.45 persons per dairy cow, the production of butter has increased from 13.51 pounds to 17.67 pounds per capita.

Thus, while the population has gained on the dairy cow, the production per capita has also increased.

Whether this is due to better methods of manufacture, to distribution of knowledge or to the keeping of better cows, is a matter worthy of consideration.

I find that the production of butter in the State of Maine, per cow, in ten-year periods, is as follows:

1850	69.21 lbs. per cow
1860	79.33 " " "
1870	83.55 " " "
1880	93.53 " " "
1890	108.08 " " "
1900	118.87 " " "
1910	98.23 " " "

and that the number of cows in Maine has increased from 133,556 in 1850 to 156,819 in 1910.

The product, oleomargarine, was first conceived and brought forth in purity and with good intentions, with the beneficent thought that it would be a good product in time of need, when butter would be so scarce that none but the well-to-do could afford it. But when its manufacture reached the land of Yankeedom, the spirit of predatory commercialism soon seized upon it, and it masqueraded in the guise of a pretender. It looked like butter, smelled like butter, tasted like butter, and in many cases was sold as and for butter by the retailer, and served as such in many cases in places of public entertainment.

For a time it was the shibboleth of its sponsors, that it was such a clever imitation that good butter judges were deceived into eating it and believing it to be butter. As time went on, it was rapidly usurping the place of butter fraudulently, and, as in all such movements, there was a reaction in which liberty-loving, truth-telling, honest-dealing people demanded remedial legislation. This resulted in the passage in 1886 of a national law taxing oleomargarine two cents per pound in order to obtain surveillance.

This statute, however, did not do away with the fraud, which had become practically the advance agent and boon companion of this product.

The statute, however, remained unchanged until 1902, when Congress amended it by providing a taxation on oleomargarine, as follows: That oleomargarine should be taxed ten cents per

pound, provided, however, that oleomargarine not containing artificial coloration should be taxed one-fourth of one cent per pound.

Here the intention was to encourage the production of a product not artificially colored, by making a difference of nine and three-fourth cents per pound in the taxation. The advocates of this measure were obliged to accept the wording, as above set forth, as a compromise, rather than the wording they had chosen, to wit: That oleomargarine not manufactured in imitation of butter of any shade of yellow should be taxed one-fourth of one cent per pound. It will be noted by the figures hereafter given, in relation to the amount of oleomargarine manufactured, that in the year 1902, prior to the new law taking effect, there were 126 million pounds of oleomargarine manufactured, and in the subsequent year only 73 million pounds of oleomargarine were manufactured; in the year subsequent, 50 million pounds, and then 51 million, and then 55 million, and then 71 million, and then 81 million and then 92 million pounds, showing that the law placing the ten-cent tax upon oleomargarine had its effect for the time.

Amount of Oleomargarine, in pounds, produced in the United States for the fiscal year ending June 30:

Year.	Lbs. Uncolored.	Lbs. Artificially Colored.	Lbs. Total.
1900	—	—	107,045,028
1901	—	—	104,943,856
1902	—	—	126,316,427
1903	67,573,689	5,710,407	73,284,096
1904	46,413,972	3,785,670	50,199,642
1905	46,427,032	5,560,304	51,987,336
1906	50,545,914	4,888,986	55,434,900
1907	63,608,246	7,758,529	71,366,775
1908	74,072,800	7,452,800	81,525,600
1909	86,572,514	5,710,301	92,282,815
1910	135,685,289	6,176,991	141,862,280
1911	115,331,800	5,830,995	121,162,795
1912	122,365,414	6,235,639	128,601,053
1913	138,707,426	6,520,436	145,227,862
1914	137,637,054	6,384,222	144,021,276
1915	138,214,907	7,595,141	145,810,048

In the year 1900 there were 107,045,028 pounds of oleomargarine manufactured, and the amount of butter manufactured was 1,491,752,602 pounds; i. e., one pound of oleomargarine to approximately 14 pounds of butter. In the year 1910 there were 141,862,280 pounds of oleomargarine manufactured, and the amount of butter manufactured was 1,619,415,263 pounds; i. e., one pound of oleomargarine to approximately eleven one-half pounds of butter.

Subsequent to the passage of this Act, certain manufacturers, through their skillful and much to be admired application of ability, succeeded in discovering some method whereby, in the selection of their materials, or otherwise, they produced an oleomargarine that was an imitation even in color of a light shade of yellow butter, but it could not be shown, or at least has not at the present time been shown, to contain any artificial coloration.

Again, the consuming public was confronted with a product in imitation or semblance of butter which contained no artificial coloration, so far as could be determined chemically and which could, therefore, be manufactured under the one-fourth of one cent tax. The manufacturers had thus gained one and three-fourth cents advantage per pound under the new law, as compared with the law of 1886.

If one were seeking for an example of application of shrewdness to business, he need look no further than this result for his example. The condition that now confronted the American public was practically as bad as the condition prior to the passage of the Act of 1886.

The sentiment for remedial legislation again assumed force, and those interested took counsel as to the best method of handling this question. There were those who still thought, as in 1902, that the substance should either be prohibited or taxed out of existence. There were still others who believed that the matter could be handled so as to eliminate fraud and still allow the commodity to be sold and served to the public under its own guise and its own name, in such way as not to permit of this fraud.

To this end national organizations sprang into existence; several state organizations, subordinate thereto, came into ex-

istence, and there was finally crystallized a sentiment to the effect that oleomargarine should be allowed to be sold as and for oleomargarine under as small as possible and yet sufficiently large tax to pay the expense of surveillance; that, however, the product should not be allowed to be manufactured in imitation or semblance of butter of any shade of yellow. It was further determined that the phrase "of any shade of yellow" should be defined. The proposition was, therefore, placed before the Bureau of Standards of the National Government, and that body, after deliberation and study of some months, brought forth a definition of the limit of the shade of yellow that might be in oleomargarine.

It was embodied in Section II of a bill, prepared by the National Dairy Union, and has since been introduced in the last Congress by Mr. Haughen of Iowa.

The Section referred to reads as follows:

"That to afford the Bureau of Internal Revenue more efficient means for the detection of fraud and the collection of revenue sections thirty-one hundred and sixty-four to thirty-one hundred and seventy-seven, thirty-one hundred and seventy-nine to thirty-two hundred and forty-three, thirty-three hundred and forty-six as amended, thirty-four hundred and forty-five to thirty-four hundred and forty-eight, and thirty-four hundred and fifty to thirty-four hundred and sixty-three, all inclusive, of the Revised Statutes of the United States, and all laws relating to internal revenue, so far as applicable, are hereby made to extend and apply to the taxes imposed by this Act and to the substances upon which and the persons upon whom they are imposed, no margarin shall be manufactured in imitation or semblance of butter of any shade of yellow—for the purpose of this Act margarin shall be deemed to be in such imitation or semblance of butter of any shade of yellow, if the diffuse reflecting power for light of wave length four hundred and thirty-six micro millimeters is less than seventy per centum of the diffuse reflecting power for light of wave length five hundred and seventy-eight micro millimeters the temperature of sample being seventy to eighty degrees Fahrenheit; no margarin shall be manufactured by mixing butter with the same or which contains more than five per

cent. of milk fat. If any person who sells, vends, or furnishes margarin for the use and consumption of others, except to his own family table in any coloration that causes it to look like butter of any shade of yellow, such act shall be deemed a violation of this law. Any person violating any provision of this section shall pay for the first violation thereof not less than one hundred dollars, nor more than one thousand dollars, and for each subsequent violation not less than five hundred dollars nor more than five thousand dollars or be punished by imprisonment of not less than six months nor more than two years, or by both such fines and imprisonment. The Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, may make all needful regulations for carrying into effect the provisions of this Act."

A further provision in the proposed measure that is worthy of note is in Section Four, which provides as follows, relative to packages in which oleomargarine is offered or exposed for sale:

"That all margarin shall be put up by manufacturers in their manufactories in cartons of fibre containers in quantities of either one-half, one or five pounds each, in no larger or smaller quantities, and such cartons or containers and each and all coverings or wrappers of margarin shall have indelibly printed or branded conspicuously upon them the word 'Margarin' in distinct letters which shall be not less than one-half inch square and be in color distinctly different from that of the package, and shall be so placed as to be the only marking on one side or surface of such carton or container except the revenue stamp hereinafter mentioned. No other marks, labels, printing, or branding than those mentioned in this law shall be made or used on any carton, container, wrappers, or coverings used by the manufacturer in connection with any margarin with the exception of shipping marks necessary in transportation unless the same be approved by the Secretary of Agriculture, but no marks or brands containing names of breeds of cattle or dairy terms or processes shall be approved. True and correct copies of all so approved marks, labels, printing, or brands must be kept on file and at all times accessible to the officers or agents of the Department of Agriculture at the office or place of business of the manufacturer. Such packages shall then be packed

by the manufacturer thereof in wooden or other containers, each containing not less than ten pounds, which shall be marked conspicuously as the Commissioner of Internal Revenue, with the approval of the Secretary of the Treasury, shall prescribe.

"The Internal Revenue stamp or stamps shall be so affixed to such one-half, one and five pound packages as to seal them securely, that such packages may not be opened without destroying the stamp or stamps affixed thereto, and all sales made by manufacturers of margarin and by wholesale dealers in margarin shall be of packages containing not less than ten pounds. Retail dealers in margarin shall sell only the one-half, one and five pound packages, to which the tax-paid stamps are affixed (and unbroken) in such manner as to seal them securely, and in quantities of less than ten pounds at one time. Every person who sells or offers for sale, margarin in any other form than the packages above described, or who packs in any package any margarin in any manner contrary to law, or who falsely brands any package or affixes a stamp on any package denoting a less amount of tax than that required by law, shall be fined for each offense not less than one hundred dollars or more than two thousand dollars, or be imprisoned not less than six months or more than two years or both."

This bill was the result of deliberations of the representatives or presiding officers of the National Dairy Union, the American Creamery Butter Manufacturers' Association, the National Butter Makers Association, American Dairy Farmers Association, National Dairy Show Association, Farmers National Congress, and the Legislative Committee of the National Grange. It is the product of the best features of the laws of the several states upon this subject, modified only by requirement shown to be necessary by experience.

It is to be noted that this is a taxing law and is to be enforced by the Treasury Department. It does not place the enforcement and surveillance under the direction of the Secretary of Agriculture. The reason for this is that the taxing power is one of the powers given to the National Government by the Constitution, and can be exercised in any state or territory or the District of Columbia. If this regulatory power were placed in the Department of Agriculture, it would have to be placed there under that clause of the constitution giving power to the

national government to regulate commerce between the states, so that then it would apply, so far as the states are concerned, only to interstate traffic. There are those who believe that it ought to be thus placed, so that the national government would control regulations in that traffic and leave it to the states to control the commodity after the goods have become commingled with the goods of the state, so as to become subject to state surveillance. This may be a question for further consideration.

LITIGATION.

In the year 1884 the State of New York passed a law forbidding the manufacture and sale of oleomargarine to be used as a substitute for, or to take the place of, butter; and then Pennsylvania passed a similar act. The constitutionality of these two statutes was questioned in both states. In the State of New York the Court of Appeals, the court of last resort of that state, held the law to be unconstitutional on the ground that the product prohibited was not a product simulating or imitating another product, but that the statute prohibited the manufacture of any oleaginous substance not the product of milk or butter being manufactured or sold for the purpose of taking the place of butter; that irrespective of the particular substance under consideration, to wit, oleomargarine, which might in time to come be produced and which would be healthful and wholesome and not deceptive in any way, yet the ban of this law would be upon it. Plainly, it said it would be beyond the power of the legislature to so enact. *People v. Marx*, 99 New York.

Practically, the same statute was declared by the court of last resort of the State of Pennsylvania to be constitutional, i. e., that it was within the power of the legislature of that commonwealth to so enact under the police power of the state for the protection of the health of the public and for the prevention of fraud. It is to be noted that in both cases last referred to, the state courts had passed upon the constitutionality of the statutes from the standpoint of the constitutions of the respective states. The Pennsylvania case was taken to the Supreme Court of the United States on the ground that it

infringed a provision of the United States Constitution. That Court, in passing upon the question, held that it did not infringe the provisions of the United States Constitution, and said in brief that a statute

“which is a legitimate exercise of the police power of the state, for the protection of the health of the public, and for the prevention of fraud, is not inconsistent with the 14th Amendment to the Constitution. That amendment was not designed to interfere with the exercise of the police power by the states.”

This decision was handed down in the case of *Powell v. Commonwealth of Pennsylvania*, 127 U. S. 678, in 1888.

Subsequent thereto, a case rose in the State of Iowa, in which a citizen of the State of Illinois was prosecuted under the statute of that state for taking into the state beer and disposing of it there in violation of said statute. It was in original packages and he was disposing of it in that form. The case ultimately reached the Supreme Court of the United States and that Court held that a citizen of one state had a right to import beer into the state as it was interstate traffic and the right to sell it there in the original packages.

“Up to such sale, the state has no power to interfere by seizure, or any other action, to prevent the importation and sale by a foreign or non-resident importer. The right of transportation of an article of commerce from one state to another includes the right of the consignee to sell it in unbroken packages at the place where the transportation terminates. A law of a state which forbids the receipt of an imported commodity or its sale before it has ceased to be an article of trade between one state and another is a regulation of commerce between the states, and void.” *Leisy & Co. v. Hardin*, 135 U. S. 128.

After this decision was handed down, a bill was introduced in Congress, known as the Wilson bill—I think—providing that whenever products of this kind were transported from one state to another they should immediately, upon their entering such state, become subject to the laws of the state to the same extent and in the same manner as though they had been produced in that state, and should not be exempt therefrom by virtue of the fact that they were in the importer’s original package.

Subsequent to the passage of this Act, a case was made against a citizen of another state for having transported from that other state into the State of Kansas, liquors to be sold in the original package. The defendant was convicted and the case was taken through the Courts to the Supreme Court of the United States, the defense being that in passing the Wilson Act Congress had delegated back to the states the power which had been delegated to Congress by the Constitution, to regulate commerce between the states, and that it had no power to delegate the power delegated to it. The Supreme Court handed down its opinion in this case (*Wilkerson v. Rahrer*, 140 U. S. 572) on May 25, 1891, the opinion being written by Chief Justice Fuller. In that opinion the Court held:

"The Act of Congress of August 8, 1890, that intoxicating liquors, transported into a state or territory, shall be subject to the laws of the state or territory enacted in the exercise of its police powers, is constitutional and valid.

"Congress had the power to enact the law of August 8, 1890, and in doing so it has not attempted to delegate the power to regulate commerce, nor to exercise any power reserved to the states."

Subsequent to this, a case was made in the State of Massachusetts against one Benjamin Plumley. The violation complained of in this case was that the defendant had brought into the State of Massachusetts an original package of oleomargarine, which was manufactured in imitation of butter by being colored yellow. The defense rested upon the ground decided in the *Leisy* case, above referred to, to the effect that a citizen had a right to import or bring into a state goods in the original package and to dispose of them in that form, irrespective of the state law based upon the police power. The Court distinguished the two cases in the following language:

"The Massachusetts statute to prevent the sale of imitation butter in its application to sales of oleomargarine brought into Massachusetts from other states is not in conflict with the clause of the United States Constitution, giving Congress power to regulate commerce among the states.

"It is within the power of a state to exclude from its markets any compound manufactured in another state, which has been artificially colored or adulterated so as to cause it to look

like an article of food in general use, and the sale of which may, by reason of such coloration or adulteration, cheat the general public into purchasing that which they may not intend to buy.

"A state enactment forbidding the sale of deceitful imitations of articles of food in general use among the people does not abridge any privilege secured to citizens of the United States, nor, in any just sense, interfere with the freedom of commerce among the several states."

Its decision was handed down in 1894, and was reported in 155 U. S. 461.

Subsequent to this, a case was made against one Schollenberger in the State of Pennsylvania, for violation of the Pennsylvania statute in bringing into that state oleomargarine in the original package. Defendant was convicted and his case taken ultimately to the Supreme Court of the United States. The facts here, as shown to the court, were the same as in the *Plumley* case, except that it was not shown that this oleomargarine was colored to imitate butter. The court in this case, held the same as is set forth in *Leisy v. Hardin*, briefly as follows:

"An importer has the right to sell oleomargarine in original packages to consumers as well as to wholesale dealers, and the exercise of this right will not be prevented by the fact that the packages are suitable for retail trade.

"The Pennsylvania statute of 1885, to the extent that it prohibits the introduction of oleomargarine from another state, and its sale in the original package *as described* in the special verdict in this case, is invalid."

Briefly, it is to be noted that the difference between the two cases was simply the difference between prohibiting the sale of an imitation or a counterfeit, and prohibiting a substance that is not such. This decision was handed down in 1897 and was reported in 171 U. S. 1.

In view of the decision in the *Schollenberger* case, it was decided to put in the bill of 1902, taxing oleomargarine, a provision similar to that in the Wilson Whiskey bill. It was so placed and is Section 2 of the present proposed bill, and reads as follows:

"That all articles known as oleomargarine, margarin, butterine, imitation, process or renovated butter, or imitation

cheese, and any substance in the semblance of butter or cheese not the usual product of the dairy and not made exclusively of pure and unadulterated milk or cream, transported into any state or territory or the District of Columbia, and remaining therein for use, consumption, sale, or storage therein, shall, upon the arrival within the limits of such state or territory or the District of Columbia, be subject to the operation and effect of the laws of such state or territory or the District of Columbia, enacted in the exercise of its police powers, to the same extent and in the same manner as though such articles or substances had been produced in such state or territory or the District of Columbia, and shall not be exempt therefrom by reason of being introduced therein in original packages or otherwise."

The oleomargarine people, or persons representing them, who are opposing the present attempt at national legislation, have been very much opposed to this section. It might not be out of place to call attention in this gathering, that, in the *Plumley* case, the court had distinguished against the colored product on the ground practically that it was an imitation or counterfeit, or fraud. In the bill then pending, which afterwards became a law, there is a clause specifically taxing colored oleomargarine, and which was not done before.

The law of 1886 simply taxed oleomargarine. It was during the existence of that law that the *Plumley* case was handed down.

It is a well-known rule that what the national government taxes it recognizes as a legitimate article of commerce. A bill then pending was to tax colored oleomargarine specifically. It thus was being recognized as a legitimate article of commerce. It was then thought that, under this rule, if another case went before the Supreme Court, the oleomargarine people would raise the proposition that since the passing of the decision in the *Plumley* case, colored oleomargarine had to be an imitation or fraud from a legal standpoint, in view of the fact that Congress had specifically recognized it as a legitimate article of commerce; and that it would, therefore, not be within the power of Congress to view it as a fraud, and that the goods thereafter could be sold, irrespective of color, in the original packages. To prevent this possibility the section above referred

to was placed in the law so that when the goods entered a state, irrespective of their being in the importers' package, they should become subject to the laws of the state immediately upon entry.

Another provision in the proposed national enactment is in reducing the tax from ten cents on colored oleomargarine to one cent, and on the uncolored to one-fourth of one cent. This was conceded on the part of the advocates of the measure to the great cry going over the country against the high cost of living, and that this tax was a burdensome one, adding to the cost of living of the poor people.

The oleomargarine people, themselves, in their bill had placed a one-cent tax upon oleomargarine. The Collector of Internal Revenue of the United States stated that one cent per pound would, in his judgment, defray the expense of surveillance and collection.

In 1904 a decision was handed down by the Supreme Court of the United States, involving taxing. The case is entitled *McCray v. United States*, and was reported in 195 U. S. 27. The Court, in handing down its decision in this case, held in brief, as follows:

"The motives or purposes of Congress in enacting the tax imposed by the act aforesaid, as amended, Sec. 3, on artificially colored oleomargarine, are not open to judicial inquiry in considering the power of that body to enact such legislation."

"The congressional power to levy excises was not exceeded by the enactment of the act aforesaid, as amended, Sec. 3, imposing a tax on artificially colored oleomargarine, because the enforcement of such tax will destroy or restrict the manufacture of that article.

"An excise which does not conflict with any express limitation of the Federal Constitution cannot be held invalid because the court may deem the rate of taxation too high.

"Due process of law is not denied by the enactment of Congress, imposing an excise on artificially colored oleomargarine, because that body has not chosen to tax natural butter artificially colored.

"Any implied constitutional prohibition which may prevent the destruction by Congress of fundamental rights which it is the duty of every free government to safeguard, cannot be invoked to invalidate the excise, because the effect of the tax

may be to suppress the manufacture of the article, and it does not infringe the constitutionality guarantee of due process of law."

The oleomargarine people, or some of them, manufactured a product containing a small quantity of a vegetable oil which served to give the product a yellow shade. This, it was said, was a substantial ingredient and that it could not be held to be an artificial coloration. The United States Supreme Court in 1904, in *Cliff v. United States*, 195 U. S. 159, held:

"A finding that the use of palm oil as an ingredient of oleomargarine was substantially only for coloring purposes will not be disturbed on appeal, where it is based on testimony that, out of a total of 160 ounces, only one and one-half ounces were palm oil, and that this quantity imparted the yellow shade which caused the product to resemble butter."

A similar question was raised in the case of *Moxley v. Hertz*, 216 U. S. 341. In that case the court said:

"Where the function of a natural ingredient, such as palm oil, used in manufacturing oleomargarine is so slight that it probably would not be used except for its effect in coloring the product so as to look like butter, the product is artificially colored and subject to the tax of ten cents a pound."

In 1914, the Supreme Court of the United States handed down a decision in the case of *Hammond Packing Co. v. Montana*, reported in 233 U. S. 331, in which it held:

"A state may forbid the manufacture of oleomargarine altogether without violating the due process or equal protection provisions of the 14th Amendment" and quote approvingly *Powell v. Pennsylvania*, 127 U. S. 678.

It is thus to be noted that the difference in the decisions of the New York case, *People v. Marx*, and the Pennsylvania case, *Powell v. Commonwealth of Pennsylvania*, lies essentially in the decision of the state courts in measuring statutes with their own state constitutions, but the decision of the Supreme Court of the United States was to the effect that the law did not contravene any provision of the National constitution. Such would undoubtedly have been the decision in the New York case, had the Court of Appeals of that state held the law constitutional and had it gone to the United States Supreme Court for a decision.

The cases above referred to have been given chronologically. In 1898, the Supreme Court of the United States handed down a decision in the case of *Collins v. New Hampshire*, 171 U. S. 30. The following are the facts in the case: The State of New Hampshire passed a measure providing that oleomargarine, or substantially that, when sold in the state should be colored pink. The power so to do had been upheld in a case in the Minnesota Circuit Court, entitled *Armour Packing Co. v. Snyder*, reported in 84 Fed., Rep. 136, in which the Court held:

"It is within the police power of a state to provide by statute that articles sold therein as a substitute for butter shall be colored pink, to prevent the deception of purchasers and consumers."

In *Collins v. New Hampshire*, the court held:

"Where the state has not the power to absolutely prohibit the sale of an article of commerce, like oleomargarine in its pure state, it has no power to provide that such article shall be colored, or rather discolored, by adding a foreign substance to it, in the manner described in the New Hampshire statute.

"That such an act is an unlawful restriction of commerce.

"The statute of New Hampshire making it unlawful to sell or keep in possession, with intent to sell in said state, any oleomargarine unless it is of a pink color, when applied to oleomargarine imported into that state from another state for sale, is invalid."

LITIGATION UNDER STATE LAWS.

On February 26, 1901, a decision was handed down in the State of Maine in the case of the *State v. Rogers*, reported in 95 Maine, page 94, in which was involved the question of constitutional law and police power in relation to a statute concerning oleomargarine. This was an indictment against the defendant for selling a quantity of "a certain substance made in imitation of yellow butter, and not made exclusively or wholly of cream or milk." The trial court instructed the jury, against the defendant's request, that the statute was constitutional and valid,

"and that it was not incumbent on the government to show that the defendant had knowledge that the substance sold by

him was oleomargarine or a substance 'not made exclusively and wholly of milk or cream,' or to prove that there was an intention on his part to deceive the purchaser by selling him for pure butter, a substance which resembled butter but which in fact was not butter."

"The jury returned a verdict of guilty and the case comes to this court on the defendant's exceptions to these instructions."

The court affirmed the decision of the lower court and said:

The statute is not "repugnant to the interstate commerce clause of the federal constitution. It is within the power of a state to exclude from its markets any compound manufactured in another state which has been artificially colored or adulterated and the sale of which may cheat the general public into purchasing that which they may not intend to buy. The Constitution of the United States does not secure to any one the privilege of defrauding the public. Such a statute does not abridge any privilege secured to citizens of the United States, nor, in any just sense, interfere with the freedom of commerce among the several states.

"It is not incumbent on the government to show knowledge on the part of the defendant that the compound sold by him is 'not made exclusively of milk or cream,' or to prove an intention on his part to deceive the purchaser. By the plain and simple terms of the statute the act of selling such an imitation of yellow butter as therein described is made to constitute the offense. It contains no words indicative of a legislative purpose to make such knowledge or intention an essential element of the offense."

Thus, the decision in this case in your own state is in conformity with the decision of the United States Supreme Court in *Powell v. Commonwealth of Pennsylvania*, herein referred to.

On June 10, 1904, the appellate court in the State of Iowa handed down a decision in a case that was brought there from the Polk District Court, entitled *State of Iowa v. Armour Packing Co.*, 124 Iowa, 323, in which the facts were that the defendant had been indicted for the sale of a product in imitation of butter and had been convicted. The appellate court affirmed the decision of the court below and stated that the

"Code, sections 2516-17-18, when construed together, prohibit the sale of oleomargarine, which is the color of butter, made from pure milk or cream, even though it contains no ingredient the sole function of which is coloration."

"The question of whether a product intended as a substitute for butter, bears the color of pure butter, is not one of expert testimony.

"The statutes regulating the sale of substitutes for pure butter are not unconstitutional, in that they amount to a virtual prohibition of the sale of a legitimate article of commerce and a wholesome food product, thus interfering with the natural rights of man."

On January 17, 1905, the Superior Court of the State of Pennsylvania handed down a decision in the case of *Commonwealth v. Mellet*, 27 Pa. Superior Ct., 41, in an oleomargarine case, in which the court held:

"On the trial of an indictment for selling oleomargarine so as to resemble or be in imitation of yellow butter, a conviction may be sustained, although there is no evidence of the artificial coloration of the oleomargarine by the adding thereto in the process of manufacture or afterwards of any substance which had no other function than to cause it to resemble or be in imitation of yellow butter.

"The various provisions of the Act of May 29, 1901, P. L. 277, show a studied effort to prevent the sale of oleomargarine, which by reason of the addition of coloring matter, or of the selection or treatment, or combination of its component parts, is made to resemble and be in imitation of yellow butter.

"A consideration of the Acts show that the latter act is not to be given a consideration which will restrict it to 'artificial coloration' produced by the admixture of some substance which serves that purpose only.

"Except where the constitution has imposed limits upon the legislative power, it must be considered as practically absolute, whether it operate according to natural justice or not in any particular case. The courts are not the guardians of the rights of the people of the state, except as those rights are secured by some constitutional provision which comes within the judicial cognizance. The protection against unwise and oppressive legislation, within constitutional bounds, is by an appeal to the

justice and patriotism of the representatives of the people. If this fail, the people in their sovereign capacity can correct the evil, but courts cannot assume their rights. The judiciary can only arrest the execution of a statute when it conflicts with the constitution.

"Upon mature consideration of the whole question we conclude, that there was ample evidence to warrant the conviction of the defendant, although there was no evidence of the artificial coloration of the oleomargarine by the addition thereto, in the process of manufacture or afterwards, of any substance which had no other function than to cause it to resemble and be in imitation of yellow butter."

On January 8, 1908, the Wisconsin Supreme Court handed down a decision in the case of *Meyer v. State*, reported in 134 Wis. 156. This was a case in which oleomargarine was made in imitation of yellow butter produced from milk or cream. In this case the court, among other things, said:

"In a prosecution under sec. 4607c, Stats. (1898), as amended by ch. 151, Laws of 1901, if the article claimed to be in violation of the statute is in imitation of yellow butter, it is immaterial whether such imitation is brought about by the addition of a dye or by the selection of ingredients.

"Color is the impression given to the eye by lines of light of various rates of vibration.

"The words 'which shall be in imitation of,' used in sec. 4607c, Stats. (1898), as amended by ch. 151, Laws of 1901, in describing the contraband compound, imply a conscious imitation in the manufacture thereof.

"In a prosecution under sec. 4607c, Stats. (1898), as amended, it is not error to *refuse* to direct a verdict of acquittal when there was evidence from which the jury would be authorized to infer conscious imitation in the manufacture of the compound; and that the accused had knowledge that the compound was not butter, and in fact sold or shipped it."

The Court further said:

"It being conceded that the product contains no ingredient injurious or dangerous to health, and the statutes containing provisions recognizing the right to sell, but requiring the seller to disclose the nature of the article sold, and forbidding the

product to be in imitation of yellow butter, it must follow that this police regulation respecting the manufacture and sale relates, not to the public health, but to the public safety, that is, to the prevention of frauds or imposition. The statute must be construed accordingly."

While these principles were set forth in the opinion of the Court, the case was reversed and sent back for a new trial on the ground that the judge, in charging the jury, had erroneously charged as to the law.

On December 16, 1913, the Court of Appeals of the State of New York handed down a decision in the case of the *People v. Guiton*, 210 N. Y. 1, in an oleomargarine case in which the Court held:

"While oleomargarine may be manufactured and sold under regulative restrictions and requirements to take the place of butter, the legislature may enact laws to prevent fraud and deception, to suppress false pretenses and promote honesty and disclosure in relation to its production and sale.

"Imitation of butter may be effected in either of two ways, at least; the one, the use of artificial coloring matter which is not an essential ingredient but serves the sole purpose of achieving the imitated color; the other, the selection of the ingredients as to color and proportions, or both, with the predetermination and purpose of producing the imitated color. The purpose of section 38 was to forbid the use of either of these two ways, or any other analogous way, of causing oleomargarine to be in imitation or semblance of butter.

"Where oleomargarine was in a package within the maximum size, sealed, wrapped and labeled in all respects as prescribed by the Agricultural law, and sold as and for oleomargarine, and there was no deception or attempt to deceive in the sale, and it is found that the resemblance to natural butter 'was a resemblance in inherent qualities common to both butter and oleomargarine, and was not the result of any artificial means or selection employed in the manufacture of said oleomargarine,' there is no violation of the statute."

In this case the Court of Appeals reversed the decision of the Appellate Division of the Supreme Court which held that the defendant had violated the statute in selling oleomargarine

in imitation or semblance of butter irrespective of how such imitation was produced. The Court of Appeals reversed that decision on the ground that the state had failed to show a conscious selection of materials by the manufacturers to produce an imitation, which, in brief, means that under this statute, in order to secure a conviction where the goods are not artificially colored, the state must show that there was a conscious selection of the ingredients by the manufacturer to produce a commodity in imitation or semblance of butter of some shade of yellow.

CONCLUSION.

It would seem from the above that the population of this country is increasing more rapidly than the increase of the dairy cattle, and that the instruction or education being given to dairymen is bringing about a condition of things, whereby there is a greater production than heretofore per cow, and yet it would seem that the manufacture of oleomargarine is gaining on the manufacture of butter. If this gain on the part of oleomargarine is a healthful, honest gain, then we have nothing to say about it or against it, but if it is being produced by deception or fraud, that deception should be curtailed or restricted to the end that honest dealing may result.

In view of the above, I am of the opinion that the best law to prevent the sale of the imitation product is one requiring the goods to be done up in packages in certain form and size and wrapped, stamped, sealed and branded so as to show the true character of the constituents, and that the commodity inside must not be in imitation or semblance of butter of any shade of yellow; that such a statute in the states where the courts have held, as in Pennsylvania and Maine, that the fact that it is an imitation is of itself a violation irrespective of how it was produced, and such states can very readily require and easily enforce the laws against the imitation or fraudulent sale of the product.

HOW OLEO AFFECTS THE PRICE OF MILK BOUGHT UPON THE BUTTER-FAT BASIS.

C. L. JONES, Corinna.

(Stenographic report.)

I think there is a misunderstanding, somehow, between the farmer and the creamery man. We do not get near enough together and I do not know that we ever will under present conditions, unless the creamery man gets down to the farmer and understands his interests and talks these things over in a friendly way, and not feel that he is a little above us.

I think Brother Bradford's paper, while it is good from his standpoint, is rather misleading. I think Brother Adams' remarks were misleading when he was telling us about his six cent milk. This was all good, but when they make these statements, they should let us know the amount of butter-fat they are producing.

In this matter of purchasing milk in several ways; it does make a difference to farmers how this milk is purchased, and it would be well for us farmers to have these milk purchasers adopt one plan. Now, for instance, in some of these methods when the farmer gets above 3.50 per cent milk they pay thirty or thirty-five cents when they claim it is worth forty cents. Is that fair? I think not. I think you ought to come down to us and talk these things over. If you have six per cent milk and a cow that gives twenty pounds of milk, you will not get as much as you would for three per cent milk and forty pounds, because you are then getting a lot of that good hog food, which is worth considering. Whenever we come before an audience of this kind, we should be careful to make our statements plain.

It seems, when we look at the charts showing the way cows and sheep have been diminishing in New England, that there is something the trouble somewhere, and where can it be? There is certainly a cause for it. In a town I know of, where

they used to sell annually from fifty to seventy-five thousand sheep for a big concern—Swift's—they have so reduced the price of lamb that they have killed all competition. As a result there are no sheep, and we have the highest prices at present. The same thing with cows. That does not encourage a large producer, a man who can produce large quantities of milk. I live near a condensed milk factory. The team passes every day, carrying milk to that factory. When the factory started, eighteen or twenty years ago, everyone wanted to furnish milk. But they kept exacting more and more of their patrons, and now they have employed men at large salaries to go out and solicit patrons from a distance; people who could never be dairymen in the world. Dairymen are born and not made, as the poets are. They have kept the milk down and have increased their expenses a good deal more than if they had got the milk from local dealers. They have paid one dollar a day for a man to haul less than eighty pounds of milk to their team and then they haul it to Newport. Now, there are other instances of the same kind. Are you creamery men just? Are you fair? Would you ask your patrons to test their cows and then give them one cent more for their product, and mix their product with the other dealers? Is it a square deal, when you say you will give ten cents more per hundred weight for milk cooled to a certain temperature and then mix it with milk that has not been cooled at all? I think that is hardly fair usage. We want good milk, and I believe there are enough farmers in Maine who will flood these factories with milk when it is profitable; and that is the question with every industry in the world. Everything that is profitable invites capital.

Now, as to the matter of oleo. This is something that has come up within a few years most rapidly. It was somewhere in the eighties when oleo was first put on the market. Now, one hundred and fifty millions of pounds annually are coming in competition with the dairy products of every dairy state in the country. No one can question but that it is a good, healthy food. However, I believe that we see the necessity—and see it most forcefully—of men in our United States Congress and in our State legislature who understand what our farmers need.

We understand that oleo is made of animal fats and vegetable oils, and it comes in competition with our butter; of

course, this affects the price of butter-fat and, consequently, a great many of our dairymen from a financial standpoint. There are United States rules and regulations governing the sale of colored and of white oleo, but the restrictions are so numerous that it is hard for any official to enforce the law. However, if we had men in Congress and in the State legislature who understand our needs, I think in time these difficulties would be removed. It is said that the manufacturers adulterate the oleo with cream in order to improve its flavor; it is true, if it were put on the market in its natural condition, it would never be chosen for its flavor, but our Government is to blame in allowing it to be adulterated so it resembles the flavor of butter. The manufacture of this product is increasing from five to ten million pounds a year; as I remember it, we use 150 million pounds of it in this country, and only three million pounds require a tax (under the present restrictions), so you can see what we are up against.

Sometimes I think our creamery men are glad to see this because they can get butter-fat cheaper on account of it. This oleo business is growing and, unless we can get control of it in some way, it will injure the dairy business tremendously. It is a big proposition, because it is in the hands of some of the great packers of the country.

MR. LADD of Massachusetts: I should like to ask what the law is in Maine regulating the sale of oleo?

MR. GUPTILL: I think in 1907 the legislature passed an enactment that oleo should not be sold in the State of Maine.

MR. LADD: Colored oleo, Mr. Commissioner?

MR. GUPTILL: Yes; anything used in imitation of butter, it doesn't matter what. Now, as I mentioned this morning, there is a concern in existence—and more than one of them—directly interested in mixing lard, tallow and cottonseed oil. When the lard, tallow and cottonseed oil have been homogenized, the product resulting is commercial oleo and it has the flavor of milk. The manufacturers are interested because the tallow they use—up to very recently—has not cost more than five or six cents a pound; cotton seed oil less than ten cents a pound, and lard anywhere up to twenty cents a pound—it varies, of

course. It is not so very expensive to manufacture. Now, these people are shipping more and more of this product, it isn't a carload, it is several carloads that come up here and disappear. There are more than several carloads of white oleo shipped here. The Federal Government seems to be working with the manufacturers instead of the farmers. I think the creameries do not like it any better than the farmers do, when it hits them sharp. You go over here and you will find these stores are selling it to the cheaper boarding houses. Butter making has become a thing of the past in this state. Our business is selling milk at the present time. When a car of oleo is sold, it crowds out the sale of butter. There is no reason why butter, or butter-fat, should not be worth seventy-five cents, is there, Mr. Bradford? Cows have been falling off all over New England. We have ceased to be a beef country.

MR. GUPTILL: However, on general principles I think the creameries would be willing for you to get more for your product if they could get out of it and make money.

MR. LADD: Do any of your state institutions use oleo?

MR. GUPTILL: Mr. President: I move that we get into communication with the public institutions to see whether they are using oleo or not.

MR. LADD: I would like to ask Mr. Guptill what he has been doing to keep butter in and to keep oleo out?

MR. GUPTILL: I have told you we have no regulations by which we can interfere unless it is sold as a fraud.

MR. LADD: It seems to me that is something that is up to you as a people. I do not blame those people from sending in their product, it is their business. I do not blame those packers for looking after their own business, but I do blame the farmers in Massachusetts and in Maine and everywhere for allowing themselves to be crowded to the wall. This is my stand as a farmer; I am one of you.

On motion of Mr. Adams, it was voted, that the executive committee of the Maine Dairymen's Association investigate the oleo situation of Maine and take necessary measures to have the old laws strengthened and new laws enacted.

MR. ADAMS: I have been informed since I came into the hall, that there is a gentleman present to whom we owe a great

deal for his splendid fight for our interests. I know he is on the program for the evening, but I think he can give us something this afternoon without taking away any of his thunder for the evening. I am speaking of Mr. Pattee.

PRES. TUCKER: We shall be very glad to hear from Mr. Pattee.

MR. PATTEE: I think the farmers of Maine would do mighty well to devote a good deal of study, more than for their personal welfare on their farms, to the general drift and tendency of the milk business. I am glad so many of you are interested in this problem. I believe that one of the most alarming systems of the times in your state is disclosed by the chart hanging on the wall. This not only affects the stock, but the soil fertility as well. The soil cannot be maintained in a fertile manner half as cheap in any other way as by keeping live stock on our farms, so I believe you will do well to bend your energies in a broad, intelligent way—as I know you are capable of doing, and as I believe you will do—to study carefully this milk business in the State of Maine. I am to talk somewhat on that subject this evening and shall be glad then to present what I hope may be some helpful thoughts. I congratulate you on the interest and attendance here. It seems an encouraging and promising situation.

MR. TUCKER: As long ago as I can remember, when I first began to attend Farmers' institutes, there was one I was always glad to hear from; that gentleman is here today and I am going to take the liberty of calling on Prof. Sanborn of New Hampshire.

PROF. SANBORN: Dairymen of Maine: I am here in Maine at this time, accidentally on business, without knowing until recently that it was the time for your meeting. I come without a word to say, except that I am glad of this opportunity for renewing old acquaintances. For thirty-five years I have been speaking all over the State of Maine, and I have certainly found some of the finest characters here in your state I have ever met. Maine is manifestly a splendid agricultural state and you farmers have reached the time when there is no product that can be raised on your farms but that can be raised at a profit; you are living in an era when everything impels you

to press your farms for all their possibilities. You can raise grain and sell it at a fine profit; you can raise baby beef, when you have mastered the modern methods of raising baby beef. There is no product of the farm today that does not invite the capital, and labor, and skill, and machinery of any great business. Our land must be intelligently developed; acreage will not increase, while population is increasing. High prices will mean a higher type of agriculture and for a time we will strike a new level. I do not know, I am sure, what there is before us in agriculture, the possibilities are so great. It seems to me that there is an era just opening to the farmers, such as the world has never dreamed of, and opportunities that invite the best talent we have. I can give no better advice to young men than to look sharply into the advantages offered by agriculture. The sunrise of the future is the farm, and the sunset is its obliteration, for the cities have their work to do and must be fed.

Now, I have been talking along, without any particular line of thought, but if there is anyone here who has any question, I should be glad to give him the benefit of my experience.

MR. HOLSTON: What is the cause of the decrease in the number of cows in New Hampshire?

PROF. SANBORN: The same cause that extends all over New England. Notwithstanding the effort of the Milk Producers' Union to get an increase of price, there has never been a time when a quart of milk has been made at so small an amount of profit. Corn that I could buy for thirty cents is 47 cents; all your expenses are higher. Your labor is restless and uncertain and, knowing its power, is not efficient. That is the reason; the decrease in the profit.

DR. WOODS: Those figures on the wall have no relation with this year; they date back more than eighteen months and have nothing to do with the present prices.

PROF. SANBORN: I understand that; but they have been the conditions, and will be.

DR. WOODS: I wonder if the thought could possibly have been an effort to get rid of poor stock and if now we have a survival of better cattle?

PROF. SANBORN: There are features of that question to which he has referred; I think we have a more efficient farmer and a more efficient cow than ever before.

Question: Does anyone know how the census stands in Wisconsin?

PROF. SANBORN: I do not. It is the greatest cow state in the Union. The cow population was standing about still. As a whole, it has been decreasing and you know the cattle of America have fallen off ten millions within the course of a dozen years.

Question: What were your conclusions a year ago when you were before the Interstate Commerce as to whether the price was sufficient to pay a good profit, or not?

PROF. SANBORN: I have forgotten. I estimated the cost, reckoning at the common rate of interest. I made the cost four cents. The cost of milk today would be placed at four and one-half or five cents.

Question: Would you mind speaking of the relative summer and winter cost of making milk?

PROF. SANBORN: The summer price of milk costs more on the ordinary farm than the winter. Probably not a man in the house will agree with me, so I must defend myself. Your pastures are good through June, then there is a constant diminishing in July, August and September of the pasture feed and the cows will fall off probably 100 pounds. When the cows come back to the barn you have to give them an additional amount of feed to bring them up in weight; then, as they have fallen off in weight, they have also fallen off in milk, and you cannot restore the amount of milk again because the cows are coming nearer to the time of dropping their calves. There are several other factors that enter into this question, but when you have considered them all scientifically and fairly, you will find your summer milk costs you as much or more than the winter milk, and that there should be one price in Boston and all over New England throughout the year. I am asking my friends in Boston when they are establishing the price of milk to consider this matter.

MR. BRADFORD: If they have a surplus in summer, even if they do sell it at the same price, they pay a good deal higher

price in November and December, and after Christmas there is not so much cream and milk consumed anywhere, I guess. Now, what has encouraged concerns, when they have been handling this at a loss is, that during the flush season there would be something to take care of that loss. I am asking you in all candor, do you advise paying just as much in the flush as in the season of shortage? I am going to tell you, that there has been money laid aside in the flush season by one concern and paid out in the season of shortage, and the idea has been to induce production at that season. I am going to tell you another thing. One concern that laid by a little money in the flush season is going to have a dividend in June, July and August, because we have more money than we are justified in keeping from the farmers. Now would you do that? Pay all you could in the flush season and no more than the merits of the business would warrant in November and December?

PROF. SANBORN: This is a public question before a keen body of men, Mr. Bradford is a master in his profession. I do not intend to be radical, but I mean to be understood, that the summer price of milk should be as great as the winter price. I do not mean to say I would try to get it all at once; I would demand a raise next summer larger than this winter and gradually merge the prices into one. There are farmers who raise much milk in June and none in winter, but I submit that that surplus at that moment should not dictate the price for the whole year; and when the equilibrium for the six months is summed up, it will be found there is no surplus. Your trouble lies in the fact that you have not ascertained just what I have stated; the knowledge that your summer milk costs you as much as the winter milk.

Question: Granting what you said to be true, would you acknowledge that we have to pay a premium to regulate this?

PROF. SANBORN: Perhaps so. I think it is the business of an organization like this to make familiar to each farmer of the state these truths.

Question: My idea was to find out if there is any other way to regulate this without offering a premium?

PROF. SANBORN: Yes. We should begin by contending with the men in Boston. Mr. Bradford makes butter as well as milk. My case is with the Boston contractors.

WHAT IS THE MATTER WITH DAIRYING IN NEW ENGLAND?

RICHARD PATTEE, Laconia, N. H.

(Abstract.)

Successful farming means the reasonable certainty of an income from the land sufficient to provide such measure of the comforts of life as will make farming attractive to high class men and women, when compared with similar reward from other occupations.

The income derived from land depends upon its fertility. The least expensive fertility is that provided by feeding farm crops to animals on the farms. If that form be not profitable others cannot. This means the keeping of cattle of some sort.

Beef raising may or may not be profitable in New England. Dairying is better adapted to our small sized farms, and the demands of the surrounding markets. Here if anywhere it should pay to keep dairy cows.

We are confronted by a peculiar and unsatisfactory condition in all the New England states. Our human population is increasing, our cities and towns are gaining in population by leaps and bounds. But our cows are disappearing. Almost every county shows a steady decrease in cow population during the past five years.

We have bigger cities but smaller farms; bigger markets with less production; a growing demand with a retreating supply. The question is why? If it can be answered the remedy may be found. If not, dairy farming in New England is doomed.

The first step in the treatment of any trouble is to find out what the matter is.

In this respect New England suffers from lack of reliable information. There is no cohesion among her widely scattered people divided into six states with varied and antagonistic interests. Only very lately has the general public come to appre-

ciate in the most remote degree its interest in the New England Dairy problem. Until now there has been a supply of dairy products, especially milk and cream, made in New England adequate to supply New England needs. Under past conditions the supply has decreased while the demand has increased until the point of meeting has almost been reached. Now the public is waking up slowly to the fact that it has an interest in maintaining a supply of an essential article of food. City life as well as farming is concerned in the cow problem.

At the suggestion and request of the New England Milk Producers' Association, various agencies, notably the Boston Chamber of Commerce, have undertaken to gather information relative to this matter throughout New England.

Agencies of recent origin, such as Cow Test Associations, the County Agent system and others have appeared among us, through whom we have placed some of the leaks that we knew existed in our farm economy. The most prominent has been the boarder cow. There are cows that have paid well with their product for their keep. Such cows are, however, comparatively few and valuable. Were we to reduce the cows of Maine to those who at past prices have paid their board, the exodus would be startling. But gradually that is being and *must* be done. No class of men can long maintain a losing business. It will inevitably bankrupt them. They must quit or go broke—and then they quit anyhow. Non-paying cows have eaten up Maine timber lots and other sources of income without farmers knowing it. Gradually, as he has found out, the farmer has quit keeping those cows. Hundreds of Maine farms are not today keeping enough cows to maintain the soil fertility. Such farms must decrease in production, grow less and less valuable and ultimately be abandoned for dairying.

The trouble has been that the average, and much better than the average dairy cow in New England has not paid her board.

Is it the fault of the cow? If so we might replace her with a better one. To some extent it is her fault. We have kept too many poor cows. We might have had better ones if proper care and business principles had been practiced. But it would be of little use to get a better one unless we know that her product would sell for as much or more than that of the one

she replaced. We have laid stress for years upon improved and cheapened production without regard to what that production would bring in the market. We have for years had splendid agencies for teaching us the science and art of production. We have lacked almost entirely the information we need to dispose of the product to the best advantage. It is along that line that information is to be had if we would make dairying pay. We must develop a marketing system for our dairy products.

It is that phase of the situation with which our Association deals. The first need for the perfection of a market system is exact information, the second organization and the third action.

There will never be an accurate and painstaking survey made of the marketing possibilities of New England dairy products until the farmers demand it. There will never be a demand with sufficient pressure behind it until we are organized strongly enough to make that demand felt. Therefore the second necessity takes precedence over the first, and the first thing to do becomes to organize. And in organizing the dairy industry we must not lose sight of fundamentals. Price is a secondary matter. Price depends on other things. We should organize for the purpose of finding out what the situation actually is, of determining the remedy that will improve it and of applying that remedy when once determined.

Any organization dealing with this problem should be of, for and by farmers. They should assume an attitude of friendliness and coöperation toward consumers and middle men. They should not antagonize any interest except such as stand in their way in obtaining right and justice. They should be adequately financed and command the ablest talent in the investigation and study of their problem. They should be patient and painstaking in reaching any conclusion. They should be able to back up any stand by indisputable evidence of justification. Being all this, they should stand squarely together for what is right and proper without fear or favor.

I have some knowledge of the New England milk and cream situation as a marketing proposition. I unhesitatingly state that in my judgment no business can be successfully maintained under the system or lack of system that now obtains in

this industry in these states. There is a different way of doing business in every different community, yet all are competing with each other. There is an ignorance that is profound and a distrust that is appalling. Every community sees the problem in a different light because it does its milk business in a different way. I believe the first great problem after organization is standardization. We must get rid of the present heterogeneous method under which we are all competing in the common markets.

Were the business organized and standardized we could, I believe, get for our product a fairer share of what the consumer pays. The demand for our product could be vastly increased by proper education of the consumers as to its food value. The demand per capita for cow products ought to be doubled within five years in New England. It can be and we should undertake it. We are manufacturers. We should advertise our goods. By creating a wider demand we increase our price. I believe that a demand can be created at which all the cows that New England can support will more than pay their board and the fertility of our farms be vastly enhanced. That will mean more of the good things of life for the farmers of Maine. More and better farms, higher grade of farm life, better general citizenship will follow.

The matter with New England Dairying is that it needs

- 1st. Organization.
- 2nd. Study of its problems, to determine upon action.
- 3rd. Fearless administration of the remedies determined upon.

PRESIDENT TUCKER: We would be pleased to give Mr. Bradford an opportunity to speak now.

MR. BRADFORD: The Turner Centre prices advanced July 24, again October 1 and again December 1, quite substantially, and the farmers will reap the results of it. Now, the Turner Centre people have one set price. It is true that we have a few customers that were given a discount, but you go to any ordinary buyer in Boston or anywhere and ask "What are you paying for Turner Centre products?" and he will show you a price list. Mr. Pattee has one of our price lists; can he produce one from any other concern?

We have been criticised some for paying our help a certain dividend, and it may be open to criticism, but I still think we did right and that it will work out well in the long run. Just think of the people who are handling our milk for our farmers; we want them loyal, and many times, when I cannot look after them personally and they are by themselves, there are opportunities where they could take advantage if they were disposed to, and slight this work. I think if the employees are used decently, they are more likely to give returns in faithful service. I have been criticised by a man who said, "I guess I will adopt that and pay my hired man a bonus." I am not so sure but that it would be a good idea. It may be a better thought than you realize.

I don't think the way they get along in Massachusetts compares with the way we get along here in Maine. Still, I am not objecting to our producers organizing, even if it does cost something, and if I felt I had authority to say so, I should be glad to have a committee come to our place from this Association and advise with me; I would have been glad to have advised with such a committee when I made the price last December.

Now, I agree with Mr. Pattee that we ought to have a one price system and for my part, I would agree to such an arrangement—providing they adopt our system.

MR. PATTEE: I want to say to you dairymen that I believe the Turner Centre system—so far as my knowledge goes—is the best system of milk buying there is in the country today. I think under it you get the nearest to a fair deal of any system. Let me say from my observation and experience that you ought to be glad you have a man of the type of Mr. Bradford to buy your milk. Some of the other dealers are quite differently made up from what he is and, while I think it is a risk to trust the price of your milk to the judgment of any one man, at the same time, under this system I don't know of any man in New England whom you could trust as well as Mr. Bradford.

I am very glad that he agrees with us that a better understanding is a proper solution; a lot of trouble with us in this business is due to the fact that we do not get together. We ought to have an organized body of milk farmers, taking in

every man who makes milk, and they should be in conference with Mr. Bradford in determining the matter of price and other things of interest to them.

I want to call Mr. Bradford's attention to this fact, that I said the farmers (not the Turner Centre) of Maine in my judgment are short sighted if they put the milk upon the market unless they can get the price we have struggled to get.

MR. BRADFORD: You said it depends on the demand and supply. Now, the supply is in excess of the demand sometimes. The Turner Centre were making butter out of a considerable surplus—not a great quantity, I can't say how much. It was demand and supply that inspired the advance in price the first of December. But I ought not to take any more time.

MR. HOLSTON: I think Mr. Pattee misunderstood what Mr. Bradford intended to convey this afternoon about the money retained in the flush season.

MR. BRADFORD: Our business in the season of July, August and September, included a large amount of homogenized cream; this cream makes elegant ice cream. We made something on that, and it had a lot to do with the dividend you are going to get in June, July and August. Then we stored butter and eggs; that comes in handy with our business. We never know whether we will make or lose; one year we lost, but we most always make something. Who makes the butter that the producers eat in your territory where you have been operating? Do they make it out of their own milk or does it come from the west? They cannot afford to eat their own. The farmers in Maine buy butter that comes from Wisconsin in tubs; the Maine farmers can't afford to eat their own butter and cream.

SHALL THE PRODUCERS ORGANIZE.

R. L. CUMMINGS, West Paris.

(Stenographic report.)

I am to speak on the question, "Should Producers Organize?"

I don't suppose that really needs an answer because if a man stops to think for a moment he realizes that ever since the days when men first went out to accomplish anything, the success of their enterprise has depended upon their proper organization; and this is true now more than ever before. What success would Mr. Bradford have in his business if he did not have it thoroughly organized? He would have failed long ago. The trouble in my farming—and I have farmed twenty-five years—is that the farm lacks organization. Every industry, every workman who is getting wages for a decent living in this country, is controlled by some organization, and if it were otherwise the industry would fail and the workman would not get his living. We as farmers have been preached to so long that we are "independent farmers," we have got where we believe it. We think if there is any class in the world that is independent, it is the farmers. If these figures on the wall are true, however, the trouble must be one of two things; either we are so stupid we can't succeed or we are not properly organized. Which is it? This falling off in the cattle seems to be but one of the many changes that have come to our rural communities. How many school children are there now in the districts where we used to go to school? When we went to school the districts would average 26 children right through the winter; now there is an average of three, and in many cases two and three districts are combined and then the school is not as large as one of our old district schools. There is a large decrease in the farming population. Now, as I said, we are either stupid or there is something wrong with our business. The trouble is, it requires too many hours of labor to make good on the farm;

that is one trouble. The thing we need most is an increase in revenue, just now.

About organization; Mr. Bradford said he would meet with men from this Association. That is great. Mr. Bradford is one of the best men we have in the business. If any man had any doubts about him, he should have been up to the Interstate Commerce hearing.

What are you going to do about organization? Are you going to create a new organization? We have almost too many organizations today to work them successfully. I want to say this; you don't want some little temporary organization. You want to go into an organization you already have and do business? Why? All over New England you have these organizations; you have your halls and your meeting places; most of you belong to it now, and if you don't you ought to. I speak of the Grange. It is spread all over this country and is one of the fundamental principles of the agricultural world. It was organized for the agriculturist, and it is a workable organization, too. It has regular aims and money to do these things with.

We have in the Grange an organization for the purpose of taking up these matters; some of you know about it. When we were before the Interstate Commerce Commission and we had some evidence that was pretty good, I don't think anyone could tell the cost of production any better than our Brother McIntire; we had the railroads to fight. I want to speak of something here; we were talking of the railroads in Maine largely, and when the railroad officials were confronted with the fact that that evidence was to be put on provided they made any plea for money at all, they agreed with Mr. Gardiner that they would not make the plea for money for the Maine Central railroad if we would keep Brother Webb off the stand. They now say that this pretense that the railroad needed money was all a humbug. In the Grange today you have your organization that is ready to take hold of these questions. If you have something good to do, you can get right in there and do it; that is your place.

MR. BLANCHARD: We have some consumers in the Grange: just what attitude would they take in helping us increase the price?

MR. CUMMINGS: I supposed the Grange was a farmers' institution. If we have any interests in it detrimental to the farmers, I don't think they should be considered to any great extent. I think if the farmer can get justice that is about all he can expect.

Question: I should like to ask Brother Cummings if he is a Granger?

MR. CUMMINGS: I have been for twenty-five years.

PRESIDENT TUCKER: Have you anything to say, Brother Pattee, before we close?

MR. PATTEE: I want to have one last fling at my friend, Brother Bradford. I think your organization—if you organize the milk business—can be better accomplished if it is taken as a separate, distinct proposition. Made up as it is and with the work it is doing in the east, I doubt if the Grange organization is now adapted to this sort of thing, and whether it is or not it would be a workable proposition to undertake this thing as Grange work. I think the Grange should lend itself to the movement; give the use of its halls and machinery, but this is a distinct problem and the milk business of New England should, in my opinion, be organized as a business, separate and distinct. Now, with that in view, some of us—who have made a study with the hope of perfecting such an organization—have already evolved a plan which we hope to get into working order this winter. Our plan is that these men around a common center shall group themselves into a local organization; then these will come into a county organization; each county organization shall elect some person who shall be the director of that county in the great central organization, and the central organization shall organize themselves, study markets, study prices, terms of contract, forms and methods of shipment, and it would be highly desirable that we have a dairy survey of all New England to show us the advantages of different methods of shipment. Such a survey has been completed in Windham County, Conn., showing one man how he could, by using a different container, save \$123 a year in freight. He did not realize how much it meant to him to ship in a different kind of container. Incidentally, it was also shown to him under his tests how much he would have received had he sold under the Turner Centre system, and the difference was in favor of the

Turner Centre system by \$53.00. Then, too, so far as we can enter into conference with the contractors—like Brother Bradford and others—we will do so, to see if mutual arrangements to mutual advantage cannot be worked out. These are the plans we have in mind. I am sure there is a feeling on the part of the dealers—I think Mr. Bradford will back me up in it—that they are willing to work out with the farmers a better system of handling milk. I doubt if the Grange could adapt itself just now as effectively as a separate organization.

MR. CUMMINGS: What reason have you, Mr. Pattee, for thinking the Grange cannot take up a matter of that kind? I know there is an element opposed to the Grange doing much as a body, but the Grange, in order to maintain itself, must do these various things. Why should the Grange not be the central organization? Now, would you have little organizations for all these interests? No organization can exist but a short time. You let that organization of milk men start and at once there is an influence started to get something into that organization that is detrimental to the men for whom the organization was made; it is so in the Grange. This is my opinion on the subject.

MR. PATTEE: I think Brother Cummings is entirely honest, and I am sure I am, because nobody is under greater obligation to the Grange than I am. It is because I think men with one interest can work together in a separate organization; there is more cohesion; they will stick together better if their interests are identical. For this reason I do not favor introducing the matter into a general organization like the Grange.

MR. CUMMINGS: I mean, as a department of a general organization.

MR. PATTEE: Lots of people drift in in order to get into the milk interests with us; the general public. I don't want to say the Grange isn't ready to do these things, but I do think for the immediate purpose, the better thing for us to do is to have an organization of men who are selling milk—milk products—cow products, for a business organization; then, if it is workable, possibly we can include the horticultural people. It may grow, but most things that amount to anything begin small and grow, and possibly the Grange will adopt it and give it its strength, but I feel we need an organization of men interested in milk. The milk problem is a New England prob-

lem. It is bigger than the State of Maine. What are the conditions in Vermont or Connecticut, where the milk comes from that goes into the same market with yours? If those men down there are getting a higher price in the Boston market, where your milk is sold, you will get a higher price. These things are matters of general interest; all New England is concerned in it; we feel it should be a New England boom. Do I make myself clear, Brother Cummings? That is our thought in the matter. No antagonism at all; we want to get the coöperation of all the dairymen.

PRESIDENT TUCKER: The hour is getting late, but I know we have all been interested; it has been a very profitable discussion.

MR. HOLSTON: As Brother Bradford has given this organization an invitation to appoint a committee to confer with him on the price of milk and cream, I believe this invitation should be accepted, and I move that a committee of three be appointed.

MR. JONES: I would like to make an amendment, Mr. Bradford and other milk buying concerns in the state, that we may get upon a uniform basis.

PRESIDENT TUCKER: Do you accept that amendment?

MR. HOLSTON: In this way: such other concerns as accept the services of the committee.

MR. JONES: I think they would all be glad to do it; if they would not, we would like to know it as an association.

The question was called for and it was

VOTED, that a committee of three be appointed to confer with Mr. Bradford and such other concerns as accept the services of such committee.

PRESIDENT TUCKER: Please nominate.

MR. HOLSTON: I suggest that this be left to the President to make his appointments at leisure. It is an important committee and he should have time to consider and to confer with members of the Association.

PRESIDENT TUCKER: Do you make that a motion?

MR. HOLSTON: If you wish, I will make it a motion and that will settle the matter.

MR. GUPTILL: There is one thing that appears to me like this: If you have a committee like that it will stand in the way of an organization that ought to be militant; of some impor-

tance. Brother Holston has not suggested how they are to be paid, when they would meet with the creamery men, or anything of that kind. It seems to me there should be something a little more businesslike; that they should be assured that their expenses will be paid.

MR. PATTEE: The plan of organization that we hope to perfect in New England includes this idea, that every territory shipping to some common point shall have a common market; all producers shipping to Hood, for instance, live in Vermont, New Hampshire and Massachusetts. All shippers to Turner Centre, in Vermont, New Hampshire and the Province of Quebec, it seems should include their interests with the people living in Maine who are shipping to the same concern. The organization provides that for those men shipping to the same dairy there shall be a market committee representing those sections; then the committee dealing with the Turner Centre is associated with a similar committee dealing with Hood, and another dealing with Whiting, and another in Springfield, and in Hartford, and so on. I think we have a workable plan, but I cannot go into details here. I only suggest that before any committee from the Dairymen's Association wait upon the Turner Centre and publish your announcement that a price is satisfactory, you in some way come in touch with other dealers so they may know that relatively they are getting a fair price from the concern with which they are dealing; that there should be a relation between these different markets; that some central Association should watch, and that you, in order that you may know you are getting a square deal from your contractor, must understand what other farmers are getting from their contractors.

MR. HARRIS: If I understand the situation correctly, Mr. Pattee comes here representing the N. E. Producers' League. We are gathered here under the auspices of the Dairymen's Association of Maine, both as producers and creamery men. Now, it must be a mutual thing if we look at it from his point of view, if the creamery man—call him the middle man, if you wish—and the consumer get together. It seems to me this committee we have voted should be a committee to investigate and to get men together who contribute to Hood, Whiting, the

Turner Centre and perhaps other dealers; perhaps appoint a general committee in order that something definite may be accomplished. I think the Maine Dairymen's Association is the proper channel where the start should be made. If we had a committee that would investigate the situation, and if we had a permanent committee to wait on Mr. Bradford, then we could get together and this League that Mr. Pattee represents might extend to Maine.

SOIL MOISTURE AND HUMUS.

PROF. FRANKLIN MENGES, York, Pa.

(Stenographic Report.)

I am not going to repeat that old saying to which every speaker gives expression—that he is delighted to be present, glad to see you, and that sort of thing. I feel honored to be here; I was requested to come back, and that is an honor that I very much appreciate, and I want to say so to you people of the State of Maine.

My subject this morning is "Soil Moisture and Humus." To this question of soil moisture the farmer often attributes his not being able to produce a paying crop. People blame the Almighty for their failure, because He does not reply to any of their accusations and they can go on in peace; anyway, that is what they do in Pennsylvania and I presume the same thing is done in the State of Maine. We like to blame somebody and we seldom put it on the right one.

In the State of Pennsylvania, anywhere from 35 to 55 inches of rain falls during the year; in Maine, from 40 to 50 inches, if I mistake not. I think this is about correct, but I am not as well acquainted with your climatic conditions as I am with those of my own state. Now, my friends, what does it mean to have that amount of rainfall? Every inch of rainfall represents about 113 tons of water to the acre, or, if you have 40 to 50 inches of rainfall, the land you cultivate is covered to a depth of anywhere from 40 to 50 inches with water, annually, and you know that is moisture enough to produce any kind of a crop, provided it is conserved in such a way that you will get the benefits from it. There is no question about your not having enough in Maine, or about our not having rain enough in Pennsylvania.

You may want to know why it is that, in some sections of our state, we have 35 inches of rainfall, while in some others,

55 inches. You know the Allegheny mountains cross Pennsylvania. In the counties through which these mountains cross we have 55 inches of rainfall, because most of the storms come from the southwest; and as they pass up the side of the mountains the atmosphere becomes cool and the moisture contained by the atmosphere precipitates in rain. After the clouds have passed over the Allegheny mountains, and over Fulton and Adams counties, one of the apple-producing sections of our state, the atmosphere becomes heated, consequently, it holds a large amount of moisture, and we have only about 35 inches of rainfall in these counties. We get most of our rain from the southwest storms, with the exception of the coastly storms coming up the Atlantic coast and striking the eastern section of our state from which, I suppose, you get the greatest amount of rainfall. All this has little to do with my subject, but I wanted to introduce the question in order to demonstrate why we have so much larger rainfall in some sections of the state than in others.

The question is: How to conserve the soil moisture? You and I cannot control the rainfall, but we can control the moisture, if we understand our business as we ought. We know that certain parts, or sections, of fields produce a much larger crop than other parts of the same field, with the same amount of rainfall, the same cultivation and the same seed. The question that has come to your mind and to mine is, why has that little section a better crop, when the soil is naturally no better there than the rest. The reason is, because there is more fertility there; and the question of soil moisture, I think, frequently is not of as much consequence as the question of fertility. If the fertility in your soil is in the right condition, so the plants can use it, they will not fire; that is, they will not suffer from the lack of moisture, as in a soil where that fertility is not in available condition. This is a question the farmer can control, and this is the question I am going to talk upon. I repeat, this question of fertility is just as important, and even more so, in order to get maximum crops, as the question of soil moisture, and this is where the matter of humus comes in.

The question is not stated correctly; it should have been "Organic Matter and Soil Moisture." While it is organic mat-

ter, humus has comparatively passed into an inactive condition, in so far as giving up the plant food it contains; but, like other organic matter, it holds a large amount of moisture which it will give up. Those little particles of humus which we find in the soil, when the weather is dry and the crop is suffering for moisture, if we take a microscope—and it is necessary to have one when we look for humus, because we have most of us gotten rid of it as fast as we could, we will find those little particles of humus surrounded with little clumps of roots. Why? Because, from the humus they can extract the moisture that they need. Not only do they obtain moisture, but likely they extract fertility. The humus probably contains the fertility which it originally contained, but it is not as available as in the active organic matter.

Now, while the effects of this organic matter, or humus, are similar, they are somewhat different in different kinds of soil. Take a clay soil, the organic matter has a tendency to loosen it, and it attains capacities that it never had before, when we get enough humus in it. I suppose you have some clay soils in this state and, therefore, in order to put that soil in a condition where it will be amenable to improvement, it is necessary to know how to handle it and acquire humus.

Take a loamy soil—this is the best type of soil we have, because the air can get into it, and the fertility in the organic matter in this soil can usually be made available about as fast as the plants need it. And not only that, loamy soil does not need as much cultivation. Plants are more injured in clay soil by cultivation, than in any other soil, because the roots are confined; they cannot penetrate the soil to any great distance while, in the loamy soil, they can go in every direction in search of moisture and fertility. Therefore, a clay soil should be intensely cultivated before sowing or plowing with seed, so as to enlarge the rooting space of the plants, or it should be filled with organic matter to loosen it.

Take a sandy soil. There is nothing that will do the good in a sandy soil like a lot of this organic matter, but it never stays in sandy soil. That is a pretty sweeping statement; I say, *never*. Why? Because it decomposes very rapidly, therefore the more need for getting this organic matter into these soils. The more we get, the better crops we will have. A

sandy soil will hold 22 pounds of water to every 100 pounds of dry sand; a clay soil, from 55 to 60 pounds of water in every 100 pounds; but if we take 100 pounds of dry humus, or the organic matter that has decomposed, so we can hardly discover it in the soil, it will hold 186 pounds of water. Now, don't you see, if we put one pound of the humus into a cubic foot of sandy soil which weighs, approximately, 100 pounds, we would nearly double the water-holding capacity of that soil. What does this mean? There are 43,560 square feet in an acre. Suppose we increase the water-holding capacity of an acre, at the rate of 18 pounds per square foot, and, by a little calculation, we find that the moisture in a sandy soil will be increased approximately 392 tons per acre, which would pretty nearly produce a crop of potatoes. This is controlled by the farmer; he is the fellow who can manage to get the organic matter.

How do we get this organic matter? In three different ways: Through raising and plowing down heavy sods, through the agency of green manuring crops, and through manure. The second method is very similar to the first. People tell us it is poor practice to plow down a crop of clover instead of feeding it, because we get just as much in manurial value by feeding it to the animal, or approximately as much, as we do to plow it down. Now I do not agree with that. If we were to plow down a ton of clover hay we would have a ton of organic matter; if we fed it to the cow, instead of having a ton, we would have 780 pounds of organic matter in our soil.

MR. LOWELL: A year ago last fall we sowed a piece of land to clover. There was one place where we cut a ton and a half of clover hay, while, on the rest of the piece, the average was much less.

QUESTION: Can any harm be done to land by plowing under green clover?

PROF. MENGES: Some farmers seem to think so. I never did. If we turn it under in the spring, after the weather is warm, and turn it down flat, so no air can get at it, we might do some damage; but if we have lime enough in our land, I doubt if we would do any damage, even by turning it down without cultivation.

MR. FULLER: Our potato raisers would hardly want to put much lime on the land.

PROF. MENGES: No, they would not. I am not a potato raiser. I raise corn. I am glad the gentleman brought up that matter. The trouble is, when these crops are plowed down the land is not cultivated as it should be. Some people plow down rye which was seeded in the corn stubble, after the corn was cut, to raise a second crop of corn, and frequently fail to get a corn crop because of insufficient cultivation.

QUESTION: How much dressing should we put on sandy land in order not to waste any by leaching?

PROF. MENGES: That depends on the land. If I were in Virginia, along the coast and up to within about ten miles of the mountains, I would say you were going to lose considerable. I do not know your conditions. As long as you have moisture and enough of the organic matter, you usually get the greater part of the fertility, even from commercial fertilizer.

Some years ago I had an experience similar to one just referred to. I suggested to several farmers in a community to sow alfalfa and, as usual, recommended that the thing to do was to get this organic matter into the soil. What did they do? In the fall of the year they sowed the land with rye; the following spring they turned down the rye; then limed the land well—30 to 50 bushels of burnt lime to the acre. Then they sowed the land with cow peas. One of these farmers, before sowing the cow peas, disc harrowed and prepared his soil well; the other prepared his land indifferently and the result was a sickly crop of cow peas, while the farmer who cultivated thoroughly had a splendid crop. In August we had a splendid crop. And what happened? Down in the furrow on the poorly cultivated field was a bunch of rye about as thick as my arm, which had turned black and looked like humus and was sour; while, on the well-cultivated land, when they turned down the cow peas they could not find the rye—all had changed into the active condition of organic matter.

I have said, one way we get this organic matter is by the green crops and another way is manure. I have stated already how much we lose of the organic matter by feeding it. We lose one-half of the organic matter in this way. Do you know,

the same thing applies by letting manure lie out in the weather, as applies to feeding clover and other soil improving crops to animals. At the Maryland Experiment Station they allowed 80 tons of well-made manure to lie out of doors one year. The 80 tons reduced to 27 tons. At the Canadian Experiment Station they made a similar experiment, and 1,938 pounds of manure, permitted to lie out in the open from April 29 to August 29, was reduced from 1,938 pounds to 655 pounds, and the nitrogen from 48 pounds to 27 pounds, or two-thirds of the organic matter and half the nitrogen in it was lost. This is another way in which you and I can control the organic matter.

This organic matter not only holds the moisture in the soil, but it makes available the fertility. We ought to do something to help that thing along. I think no one has done more along this line than Dr. Hopkins of the Illinois Experiment Station. Your people may have done something along this line, but I do not know about it. Lots of people do not agree with Dr. Hopkins, but he is a fighter and I admire him. What does he do? This is what he does. In connection with the organic matter that he endeavors to get his farmers to produce (in such a way that it does not interfere with the production of the regular farm crops), he uses Tennessee undissolved phosphate of lime. Why? Because he has a substance in the soil that will take hold of the decomposition products of the organic matter and put them in a usable condition. I have had some experience myself, which may not apply to your conditions.

We are endeavoring to get the farmers to produce crops in the regular rotation which will not interfere with the crops that are produced for human food in that rotation. In our rotation we have grass, first; then corn; then oats or wheat; then wheat again and then back to the grasses and clover. There we have the old four-year rotation. What do we do in order to get the right kind of organic matter, derived from the legumes? We sow cow peas or soy beans in the corn, ahead of the last cultivation. In the fall, after the corn is cut, we use a disc harrow and cut up the soy beans and cow peas, mixing them completely with the soil; then sow wheat or rye and use a limy fertilizer made up very largely of the undissolved raw Tennessee 30 per cent phosphate rock. In the

spring, when the ground can be harrowed, we sow anywhere from four to five quarts of hulled white blossom sweet clover seed, and run a spike-tooth harrow over the ground to cover the seed. We usually have a good stand of sweet clover by the middle of August, which we plow down and seed with wheat again. Last season in our work, we had seven tons, or 14,000 pounds of sweet clover—green material per acre—containing about 75 per cent moisture, and the dry matter in every ton containing very close to 40 pounds of nitrogen. Twenty-five per cent of 14,000 pounds is 3,500 pounds, and in the 3,500 pounds of dry material we have 70 pounds of nitrogen. Through the agency of bacteria this nitrogen will be converted into ammonia—in which some plants can use the nitrogen—and the ammonia through another class of bacteria will, in the presence of oxygen, be changed into nitrous acid and the nitrous acid into nitric acid. Why did we put that lime on there? In order to convert the acid that is produced by bacteria into a neutral substance, to put it into a condition in which the plant can use it.

Now, don't you see there is one reason why we need lime in our soil? Do you know how much nitrous acid 70 pounds of nitrogen will make? Perhaps your chemist here can tell you the exact amount, but it will make available more phosphoric acid than a corn crop will need, and it will make available more lime than any of your potato crops would need in one season. So we see that through organic matter we not only retain soil moisture, but accumulate and make available fertility, which is equally as important as the moisture and we obtain the paradoxical conditions which make a cold soil warmer, a warm soil cooler, a dry soil wetter and a wet soil dryer. That is wonderful, isn't it? Yet it is true and you and I have it largely under control. That is the idea I want to leave with you. I want to thank you very much for your kind attention.

PRESIDENT COPELAND: We have a few moments for the discussion, which is to be led by Frank Lowell.

MR. LOWELL: It seems to me an unfortunate thing has occurred here, when we might have listened for ten or fifteen minutes more to our friend from Pennsylvania, instead of having to listen to me; for what I know about potato diseases is very small in comparison with what Dr. Morse knows.

Now, Dr. Morse spoke about the mosaic; I was interested in that because we have handled it on our place. We had a field of a little better than a half an acre that was turned down because we found a hill of mosaic.

Here, three or four years ago, my son, in going over a piece of potatoes, found two fine hills of Green Mountain potatoes; in one hill there were 13 and in the other, one more or one less, I don't remember, but they were all fine potatoes. The tops of the plants on one of the hills, however, showed that something was not just right. We kept those two hills separate and planted them the next year. They had appeared to mature early, so we hoped by planting them we might get a strain of Green Mountains that would mature a little earlier. As I said we planted these two hills the next year, and the potatoes from one hill did not show a sign of mosaic, while every hill from the other lot was affected with the disease. This would show that the trouble was carried in the seed, but, without doubt, most of the diseases remain in the ground, as well as in the seed.

About net-necrosis: This appears to be something new and we have not discovered any method of controlling it. We planted a few Eureka potatoes in one of the fields, and in looking over the crop—I was sorting out about two bushels—I discovered two potatoes that had net-necrosis. In another field where we planted only a few of these potatoes we found many more affected with the disease, thus showing that there was some influence outside of the seed, for the seed was the same in both fields. There may have been something in the soil that helped that to grow; it might have been in the seed, but I do not know. Only think of the different influences that cut down or increase the profits in potato raising; there are 400,000 of them. I suppose it is better not to be extravagant, so I will call it 14,769. The things we have to consider are the climatic conditions, the amount of moisture, the various soils; there are a great many things we cannot control at present. One thing, we can throw out of our seed potatoes every potato that shows any sign of disease; when they do not show it, we can only do the best we can—like the potatoes that carried the mosaic in that hill and we did not see it.

DR. MORSE: It must have been an incipient case in the first place.

MR. LOWELL: Well, I suppose those stalks were inoculated in some way, but how it spreads from one hill to another is something I do not know. We have our plant pathologists working for us all the time, but they can not solve all our troubles. Two years ago there was an abundant crop of potatoes throughout the country; we all had big crops and it almost ruined some people and it did not help us any. Last year it came the other way; we got a very small crop of potatoes and for us that was a little better, for we did not have so much work to do anyway.

Voted to adjourn until afternoon, at 1.45 o'clock.

RECENT PROGRESS IN POTATO DISEASE WORK IN MAINE.

W. J. MORSE.

What I consider to be the most important thing relative to progress in the study of potato diseases in Maine I am going to mention first. This is the rapidly growing knowledge of, interest in, and appreciation of the importance of potato diseases which is shown by potato growers themselves. In the ten years that I have been connected with the work in this state I can assure you that I have seen very gratifying changes in this respect. These are the most encouraging signs of the times. No matter how thorough the investigations are, or how successful the methods of disease control which are worked out prove to be, no real progress is made from an economic standpoint if you do not have the sympathy and active cooperation of the potato growers themselves.

Much that I have to say today is largely based on a single fact which, with great frequency, is overlooked. This is, that the seed tuber is the all-important agent in the propagation and spread of potato diseases.

I believe that, in the past, both farmers and pathologists have been looking at the matter of potato disease control from what is fundamentally the wrong view-point. Moreover, I believe that the pathologists are fully as much, if not more, to blame than the farmers. It is true that some farmers have shown a very strong desire to plant culls for seed, but in my opinion we, as pathologists, have done our best to let them get away with it. This is not because we have given too much attention to the development of efficient methods of seed disinfection and spraying, but because we have not sufficiently emphasized the fact that healthy, vigorous seed is the primary requisite for obtaining a healthy crop, and that disinfection is but an additional precautionary measure, designed to assist in

attaining the same object. It is time that we faced about and began to march in the other direction.

We have been amazed and shocked at the spectacle of the most civilized nations of Europe sending forth the very best of their men to be destroyed, and leaving behind only the physically imperfect and otherwise deficient to propagate the race. We may not have stopped to think of it, but for years we have been following in many parts of America, in a somewhat different manner, what is essentially the same plan with regard to the potato crop.

How frequent it is, in times of high prices like these, that men in some localities will sell their entire crop and pick up their seed wherever they can get it in the spring. Planting small potatoes from high producing hills may do no harm, but the man who systematically picks out the small and unsalable tubers from his crop for next year's planting, is, at the same time, unknowingly, selecting for propagation all of the tubers from all of the hills on his field which, from disease or lack of vigor, produced no merchantable potatoes last season. Within three years I, personally, saw a case where a man was hauling all his crop to market and taking back with him for planting the culls which had been racked out at the potato house, because they were diseased or were too small to go as table stock, and he made no secret of his intentions in this respect.

The results from such practices are less striking than those which seem sure to follow from what is now going on in Europe, but the evidence is accumulating and they are no less sure.

Nowhere else in this country are the combined soil and climatic conditions so favorable for the best development of the potato plant as in Maine, particularly the northern part of the state. For that reason we are able to take greater chances with the seed used without apparent injury to the crop. However, during the last few years certain facts have become more and more obvious in this connection and I am by no means alone in the conclusions that they have forced upon me. Either potato diseases are on the increase or else in the past we have overlooked some of them in a most inexcusable manner. I am perfectly willing to grant that there may be something, and

perhaps considerable, in the last proposition, for both the growers and the pathologists are becoming more discriminating and more careful in their observations. On the other hand, the more I consider the situation and talk with those potato growers whom I know to be careful observers and well informed on these matters, the more I am convinced that at least some of the diseases, which are now assuming prominence and creating considerable apprehension as to their possible and probable effect on the potato industry, are either new in Maine or were previously relatively uncommon.

Unfortunately, as will be shown later, seed selection is by no means a sure method of eliminating at least one of these more recently recognized troubles. It is only fair to state this, but it does not alter the fact that seed selection is a most fundamental factor in profitable potato production. If this Association can, through its efforts, secure the general acceptance of this single fact alone, and the adoption of the lesson it teaches, the financial returns to the state as a result, for years to come, will repay many, many times the expenditure of effort, time and money now being put into all phases of its activities.

Such being the case, it logically follows that each grower should give especial attention to raising a high grade of seed for his own planting, regardless of whether he plans to sell his crop for seed or not. He should be growing a special plot each year on which he will produce his seed for the next year's planting. This idea is not based upon theory but upon what some successful, practical potato growers are doing today. While roguing out diseased plants during the growing season, and the selection, from the general stock, of entirely healthy tubers of approved size and shape for planting is a most commendable practice and cannot be recommended too strongly this does not get at the root of the difficulty. In potatoes, just as in the dairy cows, the all-important thing is whether the progeny is productive and will stand up against the conditions they have to meet. The ideal way, then, is to start with the tuber-unit method and breed up the strains which give the greatest proportion of healthy, vigorous, productive plants.

If I should so far stray from my subject as to attempt to discuss the possibility of being able to increase the productivity

of a given strain of potatoes by selection, as it is generally understood, I should be on debatable ground. However, it is a well-established fact that, with plants, the strains of the same variety often show a marked difference in disease resistance and vigor. Bearing in mind that sexual reproduction is entirely eliminated in ordinary potato culture, it is also evident that the yield on a given field is the composite result of a large number of different strains, each of which is propagated year after year, and which may show wide differences in productivity. To state the case concretely, is it not possible, when, for example, an average yield of 300 bushels per acre is secured on a given field, that this yield is the combined results obtained from strains producing possibly anywhere from 50 to 500 bushels per acre? If such is the case, and there is plenty of evidence, both from practical experience and experimental work that it is, why not begin at once to eliminate the drones and weaklings by the tuber-unit method, just as we weed out the unproductive individuals from the dairy herd by means of the Babcock milk test?

Let me cite one experience of my own during the past summer in connection with our potato disease studies. From our Green Mountain fields at Aroostook Farm in the fall of 1915 we selected 24 hills of potatoes, all of which showed evidence of mosaic disease on the foliage. Since these hills were selected at random they were each undoubtedly the progeny of individual potatoes produced in 1914. All the tubers in each of these hills were cut in the usual way and planted together in rows at Highmoor Farm in Monmouth last spring. The yields produced this fall, when reduced to the same basis for comparison, varied from the rate of 39 to 364 bushels per acre.

It is true that here we are working with strains which we knew were abnormal and the results quoted were not the primary object of the experiment, but they illustrated a fact which has been amply demonstrated by means of apparently normal plants. They also possess real significance from the standpoint of progress in the study of potato diseases—we are coming to look at the subject from a new view-point. Spraying and seed disinfection will doubtless always be necessary, but it is becoming increasingly apparent that the squirt-gun is by no means the only efficient weapon at our disposal in this fight against the enemies of our potato fields.

COOPERATIVE WORK WITH FEDERAL PATHOLOGISTS.

One important recent development in connection with the study of potato diseases in Maine is known to some members of the Association, but I doubt that the situation is generally understood. Therefore, it may be well to discuss it in some detail.

The Station has been giving attention to this subject ever since Doctor Woods became director. In the summer of 1906 the Department of Plant Pathology was established, with the distinct understanding that the study of potato diseases should be one of its main lines of endeavor and this policy has been consistently followed.

A few years ago a representative of the United States Department of Agriculture was sent to Maine, who established an independent summer laboratory at Houlton. This was in order to study, as we understood, certain phases of a problem connected with late blight which, on account of peculiar local conditions, could be carried on here to better advantage than in any other part of the country. The Station was not working on, and was not planning to concern itself with, this particular problem. The next season their laboratory was moved to Caribou and the work was considerably extended by the addition of other members to the staff. This was partly the result of the discovery of powdery scab in the state, and on account of its apparent importance as a national problem.

The next season the work was moved to Presque Isle. Through the cooperation of a number of potato growers and other business men at Presque Isle, a fine laboratory building was erected and was thoroughly equipped by the Government. From relatively small beginnings in a limited field, the work was increased in three years' time so that it appeared to be concerned with all phases of potato diseases as they occur in Maine, including those with which the Station was concerned, and upon which it had been working for years.

Strictly speaking, it is generally understood that in matters of this kind the federal government will concern itself with questions of national importance, while the Stations are supposed to confine their endeavors to problems which are more strictly of a local nature. On account of Maine's peculiar rela-

tion to the potato industry it seemed impossible to draw the line in this instance, particularly if the Station were to serve its constituents in the manner it was expected to, and in which it felt in duty bound to serve. Moreover, while each in a general way knew what the other was doing, there was a lack of active cooperation and coordination of effort. The way matters were drifting it seemed, from the standpoint of all concerned in the administration of the Station's affairs, that such unnecessary duplication would be likely to result.

In view of the facts stated, our director was authorized by the Station Council in the spring of 1915, to take up the whole matter with the authorities at Washington with a view of adjustment in a manner satisfactory to all. I believe I can safely say, after working nearly a year under the new arrangement, that this has been accomplished most thoroughly. With the present management of their laboratory and with the executive at Washington now in charge of the potato disease studies, most cordial and helpful relations have been established.

Much of the work is now being carried on in cooperation and we are to be kept fully informed as to all that they are doing in Maine or in Washington in connection with problems which directly concern Maine. The facilities of the Presque Isle laboratory are at our disposal at any time. A member of our staff was located there from May to October of the present year and one of their men will come to Orono from Washington to work with us during a part of the coming winter. The Department pathologists now have the same facilities for field tests at Aroostook farm in connection with cooperative work which have, in the past, been accorded to Professor Stuart, also of the Department, in his potato breeding work.

There are certain advantages from the standpoint of efficiency in this arrangement which are not apparent at first sight. The Department is so well supplied with men and money that in an emergency they can, if need be, attack a problem with greater concentration of effort than any station with limited means like ours can hope to do. Again, they have in their different offices and bureaus a large number of specialists in many different lines who can be called upon for advice and, if necessary, for active assistance. To cite a case in point.

This season, what appeared to be a new type of potato trouble suddenly manifested itself in midsummer in various parts of Maine. Apparently this is, in part, intimately associated with soil conditions and we were able to make immediate progress in the study of it on account of the active cooperation of the chief of the soil fertility investigations who came here and gave the matter his personal attention for several days and detailed two members of his staff to make a special study of these phases of the problem.

POTATO MOSAIC.

In the discussion which follows, no attempt will be made to describe in any detail the distinctive characters of the diseases under consideration, for this would be impossible in the time at our disposal. Most of them are fairly well illustrated by means of photographs and preserved specimens now on exhibit in the hall.

Mention has been made of the mosaic disease, a potato trouble which manifests itself in the form of a peculiar mottling and crinkling of the foliage. Its economic importance is due to the fact that where it occurs in any appreciable amount the evidence is fairly conclusive that the yields are materially reduced. While, as yet, no active parasite has been found associated with it, mosaic is carried with the tubers, and once it gets started in a given strain of seed it often gets worse, instead of better, in spite of all that can be done. The Irish Cobbler appears to be free from it in Maine, but it is becoming more and more apparent each year on the Green Mountain, and the Red Bliss is so susceptible that it is now very difficult to find a field of this variety which is free from it.

Both the Department and the Station are giving special attention to potato mosaic and it is hoped to concentrate pretty strongly upon it during the next few years if it continues to prove threatening. The Department workers have been cooperating with Commissioner Wortley of Bermuda, who spent some time in Maine last summer, in trying to eliminate mosaic from the less badly affected fields of Bliss, by roguing the diseased plants as fast as seen. While this is undoubtedly beneficial, the prospects of entirely eliminating the disease in this way or even preventing its increase are, from my limited

observations, somewhat discouraging. This is contrary to what might be expected on general principles, unless it should be shown that it, like tobacco mosaic, can be readily transmitted from plant to plant in the field.

Our work at Highmoor Farm last summer suggested the possibility that local climatic or soil conditions might be a factor in the development of the trouble, for on the crop there only mild cases of mosaic occurred, while the seed tubers came from plants which showed it in a pronounced form at Aroostook farm the season before. Certain other interesting results were obtained from this lot of potatoes, but I will not take time to discuss these now for it is unsafe to draw conclusions without repeating the experiments, possibly several times.

NET-NECROSIS AND SPINDLING SPROUT.

For some years we have been observing in Maine a peculiar type of tuber trouble—something which I think most practical potato growers have seen at one time or another. This is characterized by numerous, minute brownish streaks often forming a more or less imperfect net-work throughout the flesh of the potato, more particularly at the basal end. This has sometimes been confused with the fungous trouble, known as *Fusarium* disease. The discoloration in the case of the latter is confined to the vascular tissues and appears as a more or less imperfect ring a short distance below the surface of cross sections made near the stem end of the tuber. Dr. W. A. Orton has proposed the term net-necrosis for the condition first mentioned.

Prof. F. C. Stewart of the New York Station, a short time ago, published some very interesting observations on another potato trouble of considerable economic importance, which had been previously overlooked. This he has called spindling sprout, and the name is a particularly descriptive term. Now that our eyes are opened we find we also have spindling sprout in Maine, and it is by no means uncommon. This is another emphatic reminder that whenever we see an abnormal plant we should not pass it by without further consideration. It may be more worthy of serious attention than all the healthy ones on the field.

Repeated attempts in our laboratory to isolate a bacterial or fungous parasite from tubers affected with net-necrosis have only resulted in failure. We do not know its cause, and did not know its effects, other than that it made the tuber unsalable for table use. Numerous inquiries have been received, asking if it was advisable to use for seed purposes tubers so affected. On general principles we have advised against it, for experience has indicated that it is unsafe to plant any abnormal tuber. However, for the past two years we have been asking these and other questions relative to net-necrosis of the tubers themselves, both in the greenhouse and in the field at Highmoor Farm.

This work, although it must be regarded as still in the preliminary stages, strongly indicates that the man who plants potatoes affected with net-necrosis may safely increase his acreage materially, without taking the trouble to provide additional storage for his prospective crop. If he does not know what spindling sprout is, let him plant tubers affected with net-necrosis and learn to his entire satisfaction what it looks like. Please note that no claim is made that net-necrosis of the tuber is the sole cause of spindling sprout in the plant. The fact remains, however, that in our experience so far, one follows the other with great regularity.

Two lots of tubers, practically all of which showed net-necrosis, were planted at Highmoor last spring. Part of the seed pieces failed to germinate. In one case, of the hills that did come, 183 out of 204 showed characteristic spindling sprout, and there were few normal ones among the remainder. In the other, not a single healthy plant was produced and 86 out of 119 were classed as typical cases of spindling sprout.

The yield of the first lot was at the rate of 100 bushels per acre, and of the second, 38 bushels. The poorest plants and the lowest yield was obtained from the tubers which showed the greatest amount of net-necrosis at planting time. One lot of healthy Green Mountain seed tubers and another of Rural New Yorker on the same field, in adjoining rows, under as nearly as possible identical conditions, each produced at the rate of over 325 bushels per acre.

RHIZOCTONIA STEM INJURY AND THE "LITTLE POTATO DISEASE."

In central and southern Maine in certain seasons, much damage, the nature and amounts of which are not even suspected by the average grower, is caused by the attacks of the *Rhizoctonia* fungus upon the parts below ground. Young shoots are cut off before they reach the surface, older ones and the roots are more or less injured, resulting in premature ripening, and the young tubers are cut off from the parent stem by the destruction or girdling of the stolons upon which they are borne. Observations made in Aroostook last season indicate that the same form of injury is more common there than had been previously suspected.

Recent studies indicate that it is probably impossible to entirely control this disease, for the fungus appears to be present in potato soils, universally. It can attack a wide variety of plants and apparently can live equally well on various kinds of decaying vegetable matter.

Our studies have shown that disinfecting seed tubers with formaldehyde or corrosive sublimate helps to control it—the latter being the most effective. Applying sulphur to the soil made a marked increase in the virulence of the disease for two successive seasons. It is probable, however, that the amount of sulphur used for drying seed after cutting is not sufficient to produce any deleterious effect. Seed tubers free from the sclerotia or resting bodies of the fungus—the closely adhering brownish or black bodies which look like dirt on the skin, but which cannot be washed off—should be used if possible. Planting infected land less frequently to potatoes would doubtless prove helpful. It looks now as if the most hopeful results would be obtained from planting resistant varieties, or from breeding resistant strains of those varieties which, like the Irish Cobbler, are relatively susceptible.

BLACKLEG OF THE POTATO.

A little over nine years ago or during the first summer I spent in Maine I discovered that the blackleg disease was relatively common here, more especially in Aroostook county, although it was not generally recognized by the potato growers

as it is now. Its presence in the United States was recorded for the first time the season before by Dr. L. R. Jones in Vermont on a field planted with seed tubers which came from Houlton. This, as you know, is a bacterial disease of the stem and tuber. It had previously been found in various parts of Europe and in Canada, and is now quite widely distributed in the United States.

At the Station we have been studying blackleg in one way or another ever since, but we hope that this work is now practically completed. Laboratory studies on the bacteria associated with the disease early led to a practical means of control which may be used successfully by any farmer who will do the work carefully, and thoroughly. All that is necessary is to entirely eliminate from the seed tubers used, all that are in any way diseased or otherwise imperfect, and then disinfect the remainder with formaldehyde or corrosive sublimate before planting. Long continued observations indicate that the disease does not live over winter in the soil in Maine. Some years ago it appeared on a field at Highmoor farm where two different lots of seed from Aroostook had been planted. By careful selection, followed by disinfection with formaldehyde, Mr. Sinclair entirely eliminated it and since that time not a single hill of potatoes affected in this way has been observed on the farm.

Recent progress in the study of this disease in Maine has been along lines of scientific and general interest, although the results obtained are not without their practical bearing. Wherever this type of disease has been studied there seems to be an agreement that the general effects on the host plant are similar, although certain minor differences have been observed which might result from local climatic or soil conditions. However, investigators in Holland, Germany, Ireland and Canada had made careful studies of the bacteria associated with the disease and in each case recorded differences which led them to consider the organism occurring in their locality as a separate species. The situation was much the same as though a disease like typhoid fever in man, everywhere agreeing in its clinical aspects, was claimed to be caused by similar, though different, species of bacteria in a number of different countries.

Some years ago I attempted to collect all these named species of blackleg bacteria from Europe and Canada and then to make a careful, comparative study of them and those found in Maine. It has been a long, laborious task, but the work has recently been completed. I regret to say that, although cultures were obtained from the laboratory in which the species named in Germany was originally studied, they were not pathogenic, and I am convinced that they were not the same as originally described there. All the other named species were essentially identical with each other and with those isolated from diseased plants in Maine. Therefore, from a practical standpoint, I believe that we are warranted in concluding that, no matter from what source this type of disease comes to us, the control measures already outlined will be effective in eliminating it. Before leaving this subject I wish to emphasize the fact that any potato grower who tolerates blackleg upon his fields is subjecting himself to unnecessary loss and expense. I wish I might be able to say the same about a number of other potato diseases, but unfortunately this is not the case.

POWDERY SCAB.

In view of recent history no discussion of this kind would be complete without some mention of powdery scab. We are exceedingly thankful that, from the standpoint of the country as a whole, it is a much less serious trouble than we were led to believe at first. Even though the lesson in some instances has been an expensive one, the powdery scab agitation has served a most useful purpose, for it has set people to thinking and to observing. Now they are seeing things and appreciating things on their own farms which previously they thought existed only in the imaginations of certain impractical, scientific men who were casting about for some good excuse for drawing a salary.

Powdery scab is now known to occur in Aroostook, Penobscot and Washington counties in Maine, but is almost exclusively confined to the former. In New York, it is only in Clinton and Franklin, the two most northern counties. In Minnesota, it is confined to the three most northeastern counties, St. Louis, Carleton and Lake, either on or near Lake Superior.

In Washington, it is restricted to Snohomish county, in the northwestern part, on Puget Sound. In Oregon again, the two northwestern counties, Clatsop and Tillamook, are the only ones found affected.

It will be noted that in each state where it is now known to occur the disease is confined to those parts which have relatively cool summers and an abundant rainfall. An extensive series of experiments conducted by the federal pathologists in twelve different eastern states, from Massachusetts to Florida, have shown quite conclusively that powdery scab will not develop under the climatic conditions which exist there. Moreover, I believe that in Maine we have little to fear of its spreading to such an extent as to do any material damage outside the present known area of distribution. I believe central and southern Maine have little to fear from it, and that planting tubers affected with powdery scab in this region would result in a clean crop unless the growing season should be abnormally and continuously cool and wet.

Even in Aroostook county its prevalence is markedly influenced by seasonal, climatic conditions. This year, the rainfall there was not excessive and they had some periods of very hot weather. As a result we had difficulty in getting enough infected tubers in Caribou and Presque Isle to carry on our field tests for the coming year, yet a few years ago you could get them by the carload in a number of different towns.

Even in northern Maine, powdery scab is restricted to the wet, poorly drained soils of a definite type, and is seldom of much account on the best potato land.

None of this alters the fact that powdery scab is a very objectionable disease where it does occur, and may produce considerable damage. Disinfecting the seed with formaldehyde or corrosive sublimate and applying sulphur to the soil in considerable quantity, each tend to reduce the amount of powdery scab in the crop, when infected tubers are planted. To avoid the introduction of the disease, our experimental work has shown that the only safe method to follow is to use only healthy seed tubers and then disinfect these before planting. Where powdery scab occurs, land once contaminated may harbor the germs of the disease for an undetermined period.

ARE TEN ACRES ENOUGH?

DR. G. M. TWITCHELL, Auburn.

Expert farm economists, men technically trained, abounding in theories, have recently worked out elaborate calculations to prove that a farmer should own 250 to 300 acres in order to realize the largest proportionate profit—that less than this spells restricted income. It is apparent that these high agricultural officials are not familiar with New England conditions and while the theory might apply South or West, one must there be prepared for wholesale operations, with managers for different departments to insure success. The expensive item in most of our larger farm operations throughout New England lies in the fact that, because of character of the country, workable fields are more or less scattered. New England must ever be the home of the individual farmer, with the great majority unprepared to organize and equip large operations.

Because of the combination of influences, social, industrial, economical, an increasing army of artisans are turning from manufacturing centres to the land, not supplied with means sufficient to command large holdings and with little or no experience in farm operations. Is there a chance for this class in or near the villages scattered all over the state? Are we under any obligations to assist this class, either by doing ourselves, or by aiding them to do, that which will lead to permanence of operations?

The average farmer, with generous holdings of real estate, is very certain to extend operations over more territory than will yield the largest profit, tending thereby to lower rather than increase the average acre production of the state. The problem we are to face in the immediate future is that of helping solve the question for the man who has made just a living in the mill or factory and, having no prospects for advance, facing increased expenses without addition of comforts, turns to a

small farm as a solution for his troubles. Can such a man, ready to work, trained to economize, anxious to make good, succeed on ten acres, carrying a comfortable set of buildings? This is the problem I am asked to discuss, not as any argument against larger farm operations, surely not to disparage broader farm life and work. To my mind Maine offers peculiar advantages to this class and the service we can best render will be through leading to small rather than large holdings, certainly by helping to concentrated rather than extended operations.

The marked failures in the past among this class of incomers has resulted chiefly from the attempt to cover too much territory without appreciation of details. Today there are hundreds of men on good farms, in our state, who would be immensely benefited if, by some power, their field of operations could be reduced one-half. Firmly believing in the small farm for this increasing class, I am convinced that the state might do an immense service by aiding in determining the fact that on ten acres of good hilly land, adapted to different crops, a man can earn a good support for himself and small family.

To my mind it would be grossly unfair to present the marked illustration of specialists engaged in high pressure work, with greenhouses in abundance, where \$1,000 per acre is frequently realized, but make the basis of my plea those who, like myself, are seeking by general, rather than specially intensive methods, to solve the problem. Space writers in newspapers and magazines have worked great injury by representing a net profit of \$300 per acre from apple trees three years after setting, \$1,000 from one-half acre of everbearing strawberries or \$10 net profit per hen for the novice, statements grossly misleading, absolutely false, certain to ruin those who accept without good knowledge of fundamental principles. At the same time there is danger that men will refuse to accept the possibility of a fair yearly income from a few acres and be deterred from purchasing because not prepared to operate a larger farm.

With nine years' experience on a field now including practically ten acres, which, prior to 1908, has not produced \$50 a year for years, keeping an accurate account of all expenses and

receipts, by departments, I feel that I can express an opinion born of experience, yet fail to realize how it is possible to say decidedly *yes* or *no*, because of factors which must enter in. In the right appreciation of these lies the crux of the whole situation. Accepting these, my answer would unhesitatingly be *yes*, for it is a simple proposition to obtain a gross income of \$800 to \$1,000, not counting what goes into the house from the field or garden for family use, and without recourse to methods not applicable, or necessary, in all farm operations.

Most firmly am I convinced that the only path leading to success with my ten acres is, that every man must travel who owns one hundred, except that these few cannot include pasture or wood lot, for every rod must be made contributory to the sum total income. What then is necessary?

First, location in or near a town, or small village, where there is a steadily increasing number of non-producing wage earners, or summer visitors. This last class constitutes an asset of increasing value to the nearby truck farmer. The average country resident owns plenty of land but attaches very little importance to the garden, the more valuable crops possible to grow therein, or to the small fruits; hence, location must be with special reference to those incomers who turn from the cold storage or wilted city supply to the fresh products of tree, shrub, bush and land. Distance and long shipment would necessitate changes in crops and subject the grower to increased expenses. Looking for largest income, nearness to market, becomes an essential not to be overlooked. To our shame be it said that there is hardly a hotel in Maine which will consider, for a moment, that which might be of greatest value, the home grown supply of fruit, vegetables, meat and crops, simply because it cannot be depended on and is so inadequate. Here a dependable supply forces reliance on city distributors even though, as is often the case, these goods were grown, or produced, close at hand.

Second, no man can reach his best unless carrying on congenial work. Hence, location should be with special reference to what one wants to do. In this, character of soil, elevation, adaptability, as well as market facilities, become factors not to be overlooked.

Third, experience may be an expensive, but she certainly is a necessary, teacher. As in any other business, a term of years will be required to so organize work, trees, crops, fields, etc., that a permanent income may be expected. No man can hope to succeed except as he grows into this knowledge. Books and bulletins can be but suggestive aids, in that the host of writers have been those who worked from the standpoint of theory—not that of dollars earned by doing. Intelligent, individual modification of all such instruction becomes necessary to him who succeeds. If a man succeeds it must be out of his own resources, by the strict application of such business principles as would insure success in any other calling; an actual knowledge of cost of production as well as certainty of best disposal being of greatest importance.

Fourth, every man purchasing a farm must realize that time is required to organize work and put a place upon a fair business basis; hence, the would-be purchaser should be warned against expecting immediate large returns. Without specialization in crops, by the application of strict business methods, located within two hours' reach of a growing market, with possibility of increase from June to October, a man can easily bring ten acres of good rolling land where it will yield the income indicated.

Fifth, success is impossible without that enthusiasm engendered by love for, interest in, and adaptability to, the work contemplated. New England is being dotted with failures where those, misled by writers and speakers, have attempted farm life with no knowledge of details or aptitude for the duties. One of the paramount tasks for this and kindred organizations is to aid in saving the industry from disaster by helping fix fundamental principles.

Sixth, a man must study carefully his near-by market, both for present and prospective demands, certainly to determine what is likely to yield the best returns.

Seventh, not alone quantity per acre but quality in everything must be the objective, and here the problem of right care and feeding, for early growth and maturity, become of paramount importance.

Beyond, one must know how, when, where to market to best advantage. If time is demanded to give a man mastery, it is

but that apprenticeship necessary for the master workman everywhere. Good farming requires adaptability of crops to soil and man to both, better appreciation of soil possibilities, knowledge of food requirements of different crops, as well as of methods of handling, protecting, and disposal of all surplus, and, over all, the certainty daily growing stronger that one is working in sympathy with the laws of God, manifest in growth of blade, twig, tree, stalk, vine and bush. Until one comes to some clear realization of this he is in the primary work of education. From the first there will be income proportionate to the skill, insight and intelligent industry of the individual.

Pardon a personal note: I know of no other way to carry the lesson so significant to me. I have now been at work nine years upon a field which today covers practically nine to ten acres of rocky, rolling land, which, when purchased, produced little if anything. It is in our field sloping to the lake on the south. Five acres are in grass, carrying 140 young apple trees, every one dug around and hoed until the last of June when a broad swath is cut around each tree and the grass used for mulching. This cuts a circle ten feet across, around each tree and materially reduces the grass area for cropping. Two acres are covered by old trees, all the grass about them being used for mulching, together with the liberal second crop. One and one-fourth acre carries trees set November, 1910, now in process of building up by buckwheat and winter rye as cover crops plowed under in August and May. Three-fourths acre is used for garden, corn and potatoes. One-fourth acre for plum orchard and one-eighth acre in small fruits, and balance covered by bungalow and yard.

Living on the place but eight months yearly, I sell my grass standing, apples when picked and potatoes when dug. All barn manure must be purchased, costing \$6 per cord, spread. All team labor, 50 cents per hour and hand labor, 25 cents per hour. On this basis the work at Inglenook is carried on and experience fully justifies the claim made for possible earnings for others. Given 100 hens to run in the plum orchard, and improve the fruit, a market increase in net returns might be possible. A friend keeping 50 reports for year ending November 1, average production, 180 eggs per hen; average selling price, 32 cents; gross income, \$4.80 per hen.

The ten tons of well-cured hay sold would carry three cows and a horse with the corn fodder, now used as mulch for trees, purchased grain and pasturage, materially reducing the fertilizer bill, wiping out the amount for dressing, adding the net income of the cows to the gross income from crops. Certainly, the hay might easily be made to pay more than its fertilizer value.

With the hens and cows there goes the horse to reduce team hire and the brood sow to add her earnings to the grand total. That I do not employ all these is simply because I do not care to tie myself to routine work for the entire year, but am satisfied to realize substantial net returns under present methods. Have I made clear the possibility of this gross income of \$800 to \$1,000?

Experience is forcing the conviction that no man appreciates the responsiveness of nature when given an intelligent invitation, that possible tree growth and crop production reach far beyond present comprehension and that too often we ourselves are the stumbling blocks in our own pathway. We prate about what we can do, but we do mighty little. Breeders talk of the individuality of animals. I would emphasize the individuality of soils—something to be far more critically studied in the future than it has been in the past. A general classification is possible, but beyond there lies an inviting field for the individual worker. You cannot fight nature and expect to win out, therefore the buyer of a small farm will do well to follow the general line of cropping in his community until he has learned by experience what variations will be willingly accepted.

No man knows the potential power in any acre, therefore we may well be humble students of a big, big problem. We talk of large yields, yet the average is ridiculously low, and in no case does it reach full capacity. Men are content with 60 bushels of shelled corn per acre when the boys, who have unbounded faith, exceed 100. We plant 18,000 kernels per acre, in rows and hills three feet apart, and are content with 14,000 stalks, 4,000 of those being barren. Here's a reflection on our intelligence not to be lightly passed over. We charge it to the soil, the seed, the season, the fertilizer, but no one charges it back upon the grower where responsibility must

finally fall. What is true with the corn holds with all crops. The skips constitute the costly items in cropping for they pull directly on net profits.

This association aims at seed improvement and has accomplished much, yet there is an open field just ahead, to be occupied sometime by live wires, ready to serve a live industry. Good seed is the basis of all prosperity in cropping and he who attempts a ten acre farm must guard closely his seed supply in every case. The average yield of the apple trees of Maine, of bearing age, is not more than one-half barrel yearly. When the average of ten years is struck, lean years and fat, poor trees and good, one is startled at the low yield per tree. Something is wrong somewhere and, because of this yearly income, is greatly reduced. It costs me 50 cents per tree, yearly, to prune, dig borers, fertilize, mulch and spray three times. It costs 20 cents per barrel to pick, with an average of one barrel to the tree. Less than that increases cost rapidly. It costs one and one-half cent to get barrels from cooper shop to orchard, 36 cents for barrel, two cents to move from orchard to storage barn, three cents for storage 30 days and two cents to haul to station for shipping. Here we have \$1.14½ per barrel, cash outlay. Add to this interest on tree, taxes, insurance and depreciation on buildings and orchard, as well as implements, and one faces a cost, real, tangible, not to be avoided, which may well startle. It is time for us to get busy and find the highway to larger production. Somebody's theory is not worth the paper on which it is printed. The cold facts alone come out of personal experience.

Central Maine farmers are peculiarly adapted to fruit growing but of what avail is an orchard on a ten-acre farm if production is to be allowed to hold at this low level? It will so continue until men realize better what is involved in proper care and protection, as well as feeding of the trees, and approach a careful consideration of the problem of selection of varieties to location. On any ten acre farm, carrying natural air and water drainage, 200 apple trees may well be set, provided the owner is a lover of trees and is ready to do his part faithfully. The great bulk should be of the best variety grown in the neighborhood. Give the tree agent a wide berth. Ex-

periment with very few new varieties and let these be recognized for superior quality, hardiness of stock and persistence in bearing. The curse of the business today lies in the difficulty in getting trees true to name.

The tree agent or nursery owner cares only for your order, and what variety is best for your locality you alone can determine. My experience is that the best one with them is the one they have the most of, or find the hardest to sell. It is perfectly safe to assert that it does not pay to grow early fall fruit, unless it be the better class of cooking apples like the Duchess. Even the Wealthy is losing its popularity in the markets, and among growers, who are turning to the McIntosh, Baldwin, Spy and Stark for the bulk of their crop. Don't multiply. The extra expense in handling and selling cuts out all surplus. Make a record for one variety and let that be one popular in all markets. Aim at 200 barrels, or more, yearly, from these 200 trees after ten years old. What is true with apple trees holds with all small fruits. My word to the buyer of a ten-acre farm would be to grow into the production of all small fruits and cover the range from early strawberries, raspberries, currants, gooseberries, blackberries, the volume to be increased as one learns to keep healthy and productive and to market at best advantage. Avoid novelties and rely on tested varieties. To realize \$800 to \$1,000 gross income, every rod must be invited to contribute. Idle land is an expensive luxury. In all garden work, aim at two crops yearly, if not three. This means the organizing of every rod for business. Knowing something of your market and its demands, decide to lead, not follow. Be ahead of the game. This necessitates that one commence planting, on paper, in December. Only he who maps out his garden in advance can hope to avoid costly errors at planting time. To so organize an acre that it can be kept busy throughout the season, calls for careful thinking in advance of planting time, and here is where income is to be determined.

Extensive, intensive work necessitates the greenhouse, but that imposes expense and skill beyond every-day farming. The cold frames, six by six feet, can be made a decided help to anyone wanting early vegetables. Planting in rows four to

six inches apart, one can start a great variety of seeds and be ready to transplant as soon as the land is ready. There's hardly a crop wanted which cannot be started in this way and transplanted without loss. This insures a place in the market when products are in most demand and prices are highest.

The chief reason why production is so low per acre is because our land is not fully prepared. This applies everywhere, but has a tremendous significance in the truck garden. Deeper plowing, the more careful turning of the furrows to insure an even angle to the sod, and then the persistent working of the land until ready for the seed, decide production. Profitable crops are an impossibility without abundance of barn manure or fertilizer. Not how little will answer, but how much can be made to pay, must be the rule with the grower seeking to realize most from ten acres.

Back of all there arises another problem not yet appreciated by growers. Our soils must be put into a more normal condition to grow healthy or abundant crops. Virgin soil is healthy soil—healthy because it carries all the elements necessary for best life of seed, plant, product, animal, man. Continued cropping without fully supplying these elements, or completely working the land, results in the unbalancing of the soil and impoverishing of food produced. Sixteen essential elements are necessary for a balanced product. If wanting in the soil, they must be in waiting in the crop, in the animal and in man.

Abundance of clover speaks of soil vitality and virility, hence may be accepted, in general, as indicative of healthy soil. Where herds grass grows, the need of lime may be suspected; and where redtop and June grass appear, we may safely turn to lime to start restoration. Reliance on commercial fertilizers has increased this unbalanced condition through dependence upon three of the elements, even though some others be present in minor quantity. The one step to be emphasized everywhere, and absolutely necessary to the making profitable of ten acres, is the increase of barn manure. The soil requires humus as well as food to sustain its life and this necessitates barn manure and cover crops. You cannot develop those friendly forms of bacteria necessary for the best life of the soil by the use of nitrogen, phosphoric acid and potash; and bacteria we

must have to assist in multiplying plant food in the soil and putting the same into most available form. You cannot build healthy soil products out of deficient soil food. He who attempts to draw his support from ten acres must seek the best of his soil through the liberal use of barn manure, of chemicals, or combined fertilizers, for special work, and to hasten early development, certainly by giving more attention to cover crops to be plowed under and help maintain a right physical condition as well as stimulate bacteria life.

Industrial complications point to restricted rather than extended farm areas under cultivation. The marked decrease in number of children per family, in all rural sections, forces this; the increasing difficulty in obtaining competent farm labor makes this imperative. Our motto must be maximum production from minimum acreage. Instead of 100 bushels of shelled corn from two acres, attention must be directed to securing 100 from one acre. Instead of less than one ton of hay per acre, which is above the average in New England, the aim must be two, if not three, tons. Improved farm machinery, the restoration of the soil to a healthy condition, the more thorough and complete preparation of every acre, the increase of good barn manure, and such cultivation as will exclude weeds and conserve moisture—these are the steps every man must follow who hopes to realize abundantly, whether the farm be large or small.

You cannot grow maximum crops and weeds at the same time. I cannot afford to have weeds in my corn, potatoes, garden truck or among my small fruits. Seeking income, I must exclude everything which detracts. The man who allows weeds in his crops is a sloven. Unless I am getting 30 bushels of potatoes from one bushel planted, 12 bushels of shelled corn for every quart of seed, something is wrong with my work. I have failed somewhere and must seek and apply the remedy or admit my failure to do what I ought and might. Until my trees of good bearing age, average every year a barrel and a half per tree, I have failed to get control of conditions and promote energies, and my income is not what it should be. Here is a purely mathematical problem to be worked out by every individual—one not to be neglected. Success is not to

be found; it must come, if at all, out of the enthusiasm of interested workers. God pity the man on the farm, large or small, who chafes at the requirements and hates the work. Men talk of drudgery of farm life, its false friends. There is no drudgery to him who, looking for results, seeks mastery over details. I pity the man on a farm who has not before him, continually, as an inspiration, the picture of the home he would have; fields bending under the load of abundant harvests; trees reaching out their branches that they may take on more fruit; the garden ripening, from early spring to latest harvest, the best, healthiest, most nutritious and valuable of all products of earth, who does not feel impelled, day by day, to reach out after greater dominion over all growing things, whose animals, generation after generation, are not steadily increasing in all the essentials of profitable husbandry; who, day and night, cannot walk over his acres, conscious that out of his own resources he is building on a foundation which will endure and preparing to leave the world a little better than he found it. To such a man the appeal comes with force to make of himself and his acres all that is possible and returns are ample.

There are thousands of small farms scattered all over the state, near to lake, or mountain or village, where city people congregate in increasing numbers, year by year, every one of which might be a profitable investment, returning yearly an income sufficient for a small family and insuring freedom from worry, care and future support not possible in any other field of labor.

New England does not produce one-tenth of the eggs and poultry required to supply the Boston market; and with many other products the per cent is still higher. Yet the cry goes up that there is no chance for a young man on a farm. No man on a small farm need fail of earning a good living, and more, provided he knows the purchasing power of a dollar, is fairly industrious, the location reasonably good and the line of breeding and cropping adapted to the land and the man. Men do fail, everywhere, because they are misfits, for want of that business sagacity which alone wins success in any industry. We need a thorough awakening to a realization of our opportunities and possibilities. You need this. I need it, that we may go back to our farms, larger or smaller, filled with the

conviction that the application of the lessons enforced at these sessions may be made of enduring benefit to everyone; that cooperation with nature will insure better crops; that the failure to reach the maximum is ours, not the lands; that in the range of live stock there is no class which will not return a steadily increasing profit to him who seeks to grow daily into a better knowledge of essential principles of breeding, selection and care; that in well-organized acres there are possibilities not yet realized.

There will be no room for the slipshod man in the economy of 1917. There *is* room and a big, big call for live, earnest, faithful, energetic, appreciative men who believe something so completely that they are ready to prove it by good work. To such there is no failure. My advice for years has been: Stay away from the farm if you are seeking an easy road to prosperity; come to the farm if you are ready to work both brain and hands and are determined to win out in the struggle. This is the requirement elsewhere and the farm is no exception.

I believe in the well-located small farm for the small family, seeking the simple life as the gateway to health, comfort, increased vitality, satisfaction, freedom from care and a royal support. I believe in the small farm for him who, out of his own toil, seeks that dominion which will insure substantial returns. I believe in the small farm for the small family seeking true enjoyment in life and the companionship of kindred souls. I believe in the small farm because of the obligation it imposes for specialized work and concentration of purpose. I believe in the small farm because it forces one to organize action, increase efficiency, systematize labor, test all seeds and products and minimize time, waste and expenditure. I believe in the small farm in that it forces a man to think, to do, to reach out, to achieve what on larger farms are not thought necessary.

I believe that through forced concentration, upon restricted areas, the New England farmer is yet to come to a fuller realization of the possibilities, the certainties, the profits of New England soil. I believe most profoundly in the big farm for the big farmer, the large family, the abundant crew; but for the shut-in man, in town or city, who longs for God's fresh air and sunshine, and is ready to do his part faithfully, I propose "the little farm well tilled and the little wife well willed" as promising joy, satisfaction and fullness of life.

PRINCIPLES OF PLANT IMPROVEMENT.

PROF. ARTHUR W. GILBERT, Cornell University, Ithaca, N. Y.
(Stenographic report.)

For the few moments allotted me this afternoon, I wish to discuss with you some of the fundamentals of plant breeding, and as I go along I shall attempt to apply these principles to the crops in which we are most interested.

Why do we hear so much about plant breeding at the present time? If you stop to think of it, the reason is obvious: It is the time when we are studying carefully all the factors in the process of plant growing. We have now come to a point where we are analyzing the whole of business, one thing at a time, and trying to find out where the weak points are, and by remedying these we hope to be able to bring the raising of crops in particular, to a higher state of efficiency than it is now. You all know what that means when measured in dollars and cents.

One of the weakest links in the whole chain is the seed. Farmers in general are getting to be pretty careful in buying fertilizers. We have laws requiring that the analysis be placed on the fertilizer bag and farmers are getting to know very well what nitrogen, phosphoric acid and potash mean and what they do. The analyses of feeds are quite well known by our farmers; they know what protein, fat, carbohydrates and crude fiber do and do not accomplish.

We have efficient seed laws, but I think, usually, they are far behind our fertilizer and feed laws, especially in some of the states. As a matter of fact, it seems to me there is more looseness in buying seed than in buying anything else. When we buy our seed we do not know, in many cases, where it has been grown; whether it has had any particular breeding; whether it is adapted to our particular conditions; we know nothing about its purity, its uniformity, or its power of germi-

nation. A farmer spends a lot of money in putting fertilizer on the land, spends a lot of time getting the ground ready, and then he puts in poor seed. The result is a tremendous waste.

Now, in the beginning, all plants—like all animals—are the product of two forces—those conditions which surround them—water, plant food, the sunshine and so on, have an influence upon the character of the plants, and in the seed through heredity. Some of these environmental factors are within our control, for we cultivate our plants, remove the weeds, etc.

Then our plants are the product of another force which we cannot see; which is very subtle and, in most cases, is overlooked; I refer to the force of heredity. Suppose you are going to start a good dairy. You build a good barn, expect to give your animals the best of care and the best of feed; then you go to somebody and say, "I want fifty calves. I don't care what they are." Of course, you may name some breed like the Jersey, or something else, but you merely want calves to put into this barn in which you have put so much expense. Is this not what we are doing with seed? We do not know whether they have had any breeding when we buy them. This is the point I want to get at.

Why is it that plant breeding is so relatively new? Because we have been giving our attention largely to the external factors surrounding the plants and less attention to the breeding. That is logical. We have found now that when we give the plants good care, there is another factor—that of heredity—which prevents them from yielding well until it has been corrected. It is one of the chief factors to be considered.

There is another thing which we must bear in mind, also; that is, all plants are capable of further improvement. All of our cultivated crops have gone through a state of evolution. The potato has come from a plant found in the mountains of South America, where there is a cool climate; high altitude, and a large amount of moisture. This original plant has a large number of tubers, half the size of a hen's egg. Now, man, through the years, has taken these tubers and, consciously or unconsciously, chosen the best until he has brought the potato to the stage where we know it today. Have we come to the end of this development? I think not. The original home of corn is in Mexico; it was pod corn, the individual kernels being en-

closed in small husks and then having husks over the entire ear. Man has taken that corn and, by a gradual process, has changed it into sweet corn, pop corn, flint or dent corn.

Plants are very flexible and can be changed. We have not, by any means, reached the ultimate results which may be looked for. What are the tools which a plant breeder uses? All plants differ; no two are alike. There are no two potato plants, no two corn plants, no two blades of grass that are alike. Take a microscope and examine a few cells of a blade of grass, and there are no two alike; they all differ just as persons differ. This makes the starting point for breeding purposes; if plants were all alike, there would be no chance for choice. Of course, from this follows selection. We choose the best; we plant the best; and thereby improvement is made.

Next, is what we know as "sports." Take a field of oats; go over the field and study the individual plants. You may find a few plants that are head and shoulders above the rest; these may or may not be sports—that is, exceptional plants which are the beginning of new and superior strains.

Now, we have taken up first, seed selection, breeding from the best; second, looking for exceptional plants with the hope that they may be the beginning of a new strain; then comes the third factor, the crossing of different plants; to bring good qualities of one plant over upon another plant and combining the good qualities of both. These are the three methods that are used in plant breeding.

Selection: There is a point of view I wish to present in the evolution of plants with which you may be already familiar, but which has changed our whole method of breeding in the last few years; that is, the importance of breeding from individual plants. Farmers have been selecting seed corn ever since they planted corn. When a man husks his corn he has a basket where he places the good ears—the ears he saves for seed; then he takes good care of these and uses them for seed the next spring. He takes those seed ears, shells them and mixes the corn together. You see what he has done; he has some superior ears; he has practiced selection, but he knows nothing about the power of these separate ears to transmit themselves to the next generation. He has had a good crop this year, but he is not sure that each of these good ears will

give a good crop next year. You men know that you may have some superior animals, but you are not absolutely sure that they will produce superior animals; the chances are they will, but you are not sure.

What should be done? Suppose you take fifty of the ears and, instead of shelling them and mixing the corn, you take the corn from each of these ears and plant it in a row by itself, and then see what will happen. The fifty ears all looked good; to all intents and purposes they were the same, but by planting the kernels of those ears in separate rows, and then by husking the corn separately when it is matured and piling it on the ground at the end of the row, you will have a representation of the progeny of each ear and you can see what a surprising difference there is—ranging from 50 to 100 per cent—in the yields; all the way from 13 bushels to the acre up to the rate of 75 and 80 bushels to the acre. We have found out the difference in the first year; then we want to test the transmitting power for the second year, and find out whether it will continue to produce the third year. From the little piles we choose a few more good ears; we want to find out whether the corn that grew in the first row will give as good a yield the second year. We find it necessary to try out these strains for four or five years, in order to find the strain that has the highest yielding capacity in it; and, when you have done that, the principal thing is to keep that strain pure. In other words, we find in our farm crops, or in any group of plants, that they consist of a mixture of strains. Take the Green Mountain potato—which is as uniform as almost any variety—and plant the seed individually, pick up the crop by hand, studying the different hills carefully; you will be surprised to see how little uniformity the potatoes have. This is true of all varieties of potatoes at the present time. You can see what we are really doing in that little experiment of the corn. We are really separating these better strains from the others. You can readily see if we can pick out some of these superior strains, you will make much more rapid progress than you could in any other way.

Is this not what is going on with our dairy cows? Consider for a moment; in dairy breeds—if you are familiar with the Jersey—you will immediately think of certain animals that have been the beginning of superior strains. You take a group

of any well-bred Jerseys and they probably date back to two or three prepotent animals. Take race horses; you will find that most of our race horses trace back to two or three very exceptional individuals. We are finding the same thing in our plant work.

Now you see all this differs considerably from the method of selection which has generally been practiced. Suppose we are going to begin with one thousand potatoes. We will take the best looking ones; they are not selected at all, but we simply go to our bins and pick them out; we do not know the hills from which they came. We will cut each potato into four pieces, so each potato will produce four hills; then we will plant the four hills consecutively, possibly putting up a little stick as a marker; then planting four hills, put up another stick and plant four more hills, and so on, until we have 4,000 hills. Each potato has been cut into four pieces and we have four hills for each. We will then give this little potato patch ordinary care, and at the end of the season we will dig the crop. We will dig the potatoes in the first four hills—that were planted from one potato—and put them in a little pile; then we will dig the next four hills, and so on, each pile representing the yield from one potato, until we have a thousand piles. This experiment gives us the yielding power of these potatoes. When these piles are on the ground, we will go down through the field and eliminate the poor strains; some will be irregular and some will be small. After eliminating the poor ones, we will choose the best of those remaining, taking ten tubers from each of the best piles for the second year's planting. The next year we will do the same thing, planting them in a small plot where we can pick them by hand; again, we will choose the second year and carry the experiment on to the third and possibly, the fourth year. At the end of that time we shall have eliminated the poor strains and kept the best. This is not a difficult thing to do; it requires a little record keeping, because of the pedigree selection. We began with a thousand potatoes; then we selected a few, and we want to keep a record until we obtain our results.

There is another method which I think is easier to carry out and perhaps it is, on the whole, more practical; that is, when we dig our potatoes in the fall we will plan to dig a part of

the field by hand and save for seed all of the hills which have six or more tubers in the hill; perhaps, in Maine, I ought to put that eight or ten, you can judge for yourselves. If your yield is particularly good, we will say eight good tubers to the hill. You want to make the standard high, so that only a few hills will come up to it. We will save, say, the hills with eight good tubers; we won't attempt to keep them separate at all. We will plant again the next year in the same way and will again save the hills that have eight good tubers. Now, by doing this year after year, even for a relatively short time, you have eliminated the poor strains.

A man in Michigan, who began with an ordinary strain of potatoes, used as his criterion six good tubers to the hill. The first year, eight per cent of his hills had this number; he saved those for seed. He did the same thing for five years and, at the end of that time, he had increased his percentage from eight to seventy-one. Now, I think one thing that happened was, that he became so interested in the breeding work that he probably gave the crop better care than he would have otherwise. Most of the increase was due to the elimination of the poor strains. Another man whom I know did the same thing; he found eight per cent the first year; this increased to twenty-one per cent the second year, and the third year there were forty-seven per cent having six good tubers to the hill, and this was done by a method that is relatively simple. The only thing you have to do is to dig a part of your field by hand; it takes considerable time, but if the plan is uniformly carried out you can readily see you are increasing your yield of potatoes very markedly, and you are doing it at the expenditure of a minimum amount of labor and time. If this was something that took a great amount of time, we would not suggest it with as much earnestness as we do. I have done it for four years on my farm, and I know I have increased my yield over 300 per cent; at the same time, I know I have been getting my land in better shape and have been giving my potatoes better care. Not all is due to breeding, but I believe more than one-half is due to that—breeding along this line of potato selection.

I know something of what you men in Maine have been doing, and we are going to look for a great deal more from the Maine growers and Maine seed. There is a certain move-

ment on foot in New York, as you men know, to take away your seed business. Three or four counties in northern New York have Farm Bureau agents who are attempting to get the seed potato business of Long Island, in particular, and there are hundreds of farmers in northern New York who are practicing this method of seed selection and they are really getting very remarkable results. I have been over their fields and their records, and I was surprised at their results; they are advertising extensively with the result that they are doing a very large business.

You are of course familiar with the potato train that was run in Vermont a short time ago, where this system of breeding was preached. It happens that several of the Farm Bureau agents in Vermont are my students and this is what they are after; first, a higher yield of potatoes and, second, a more uniform strain.

Now, of course, what I have said applies to any crop. If you are breeding sweet corn so as to get a higher percentage of sugar, or a more uniform strain, or an earlier strain, this applies equally well to these. If you are attempting to get a strain of flint corn with two ears on a stalk or with the ears lower down, or if you are trying for a high yielding strain of oats—as the Experiment Station in this state has been doing—you will practice these fundamental methods.

Selection—individual selection—has been carried on at the New York Experiment Station in the breeding of timothy hay. This experiment was begun ten or twelve years ago and this is what was done: They said, "This is an experiment which we are going to lay out for a series of years; if we are going to reach the ultimate goal, we will get the best material we now have, and go on from that point." Timothy seed was gathered from all over the world, from every state in the Union where it is grown and from foreign countries. They had sixteen thousand plants, so to have a wealth of material with which to work. These plants were placed in the ground so that each one was entirely separate, in order to give ample chance to study the individual plants. They were planted thirty inches apart each way, in order to find out what a timothy plant looks like, so that questions like these might be answered: Does it die out the first year, or the third, or does it live thirty years? What

are the diseases of timothy? What difference is there in timothy in its rapidity of growth; in its earliness or lateness? They have found a difference of two weeks in the matter of maturity. Some of the plants are immune to disease, others were found to be very susceptible to timothy rust which is so common at the present time. Other plants responded quickly to cutting, while others did not come up until the second year. Some plants ran along the ground, making a good pasture grass; others grew into good, high stalks and then you would, of course, get a high yield. So here were all these plants with all these differences. The next thing was to get pure seed from them, because timothy is wind fertilized. If here is a good strain and there a poor one, they will mix and you cannot get good seed. We take ordinary twelve-pound bags and put them over the plant where we want to get pure seed. Formerly we used to make a sort of tent over the plant, but this did not work well, so we use the twelve-pound bag and we find, by going out and shaking the bag every morning, a considerable amount of seed will be produced, but not a large quantity.

The next thing is to try out the producing power of each of these plants. We grow them in small rows, and I wish I had the lantern slides to show you the great difference in the timothy plants. This experiment with timothy was carried on for several years, until a certain number of very superior sorts were obtained and now there are distinct varieties of timothy—as distinct as any variety of apple you ever saw; varieties for early and late crops; for pasture purposes and for seed purposes, and so on. Two or three years ago these sorts were distributed over the state to see if they would hold up under all conditions. The field the experiments were conducted in was a clay soil. The plants were taken to Long Island and put in sandy soil, and in other types of soil, and it was found that the average yield of these superior sorts was a ton and a half more to the acre than by ordinary timothy.

SELECTION OF SEED WHEAT AND WHEAT RAISING.

PROF. FRANKLIN MENGES, York, Pa.

(Stenographic Report.)

I am afraid the subject I am about to talk upon this afternoon is not very interesting to you, because you are not wheat raisers. I come from a section of this country where we have been raising wheat for the last two centuries. For some reason, I cannot tell you why, the Pennsylvania Dutch like wheat; they like to raise it; they raised it when they got only fifty cents a bushel for it, and the longer they raised it at that price the poorer they got. There are only two kinds of people who could do that kind of thing—the Dutch and the farmer.

Another thing, I come from that section of the country where we raise winter wheat, and I am inclined to think your section is better adapted for raising spring wheat. What I am about to say is largely in connection with the raising of winter wheat.

When the time arrives that you and I will have to live more cheaply, the crop that will then be grown will be wheat, because you and I could live on two pounds of wheat a day for 365 days out of the year and feel all right. There is no other crop that contains all that is necessary to make our bodies grow when we are young; to build them up; to furnish us muscle and make good blood; to cover our bodies with skin and heads with hair. I notice some of the heads here need it.

I do not believe wheat will ever be as cheap again as it has been, because all the nations are finding out that here is a crop upon which they can live and endure far better than upon any other crop produced today; this is the conclusion of the rice consuming nations of the world and they are fast becoming wheat consuming nations.

The wheat crop is not adapted to the southern part of our country, and the flour made of wheat that is produced south of Mason and Dixon's line cannot be shipped to Cuba; the flour will not keep. I was a miller when I was younger than I am now, and I know when we were selling flour we could not ship to Cuba any flour made of southern wheat.

Some years ago the Department of Agriculture at Harrisburg made investigations among the farmers in southeastern Pennsylvania; we had farmers there who would invariably raise from thirty to forty bushels of clean wheat to the acre, while there were others who produced only fifteen to twenty bushels from the same kind of soil and under the same climatic conditions. Our Department wanted to know just why such conditions as these should exist. I was the man they sent to investigate; I do not know whether I was fit or not, but they sent me.

The Professor from Cornell has outlined in a splendid way how to do these things. Our Pennsylvania Dutch followed that plan a good while ago; they did not know why they did certain things, but they did them. A Dutchman does lots of things he cannot explain, when you ask him about them. Now, what does he do in preparation to raise a wheat crop? In the first place, he is a good farmer; he plows his land early and does extensive cultivating.

In order to find out whether early plowing has anything to do with the yield of wheat, I asked a friend of mine in York county to make experiments. I asked one man, who had been raising thirty-five or forty bushels of wheat to an acre and who plowed early, if he would not let one-half acre lie until about two weeks before seeding time, and another until a day or two before sowing the seed and then plow these half acres. The land he plowed early he cultivated six or eight times. He had a pair of old mules and an old fellow around his place; they were not worth much, but they could harrow and when there was nothing else to do the old fellow would hitch up the mules and harrow. The half acre I asked him to plow about two weeks before seeding he cultivated four or five times and the half acre I asked him to let lie until a day or two before planting, he did the best he could with, under the circumstances. We sowed the wheat the latter part of September—we watched it. It was not an experiment, conducted along simply scientific

lines, but we had a particular reason for doing it. There were a number of farmers in that section who would hang around all summer without plowing their land, and when seeding time came they would have to hustle and plow and get ready for seeding. They would tickle the ground instead of cultivating it well. I do not know whether you have that kind of men or not; some of the fellows I have seen around here look a little like it. These men of whom I am speaking would say: "Oh, it doesn't make any difference whether we plow early or not that man Anderson uses a lot of fertilizer, and that is what does it." They thought it was a case of doctoring the ground. You see, we have not gotten over this idea of taking a lot of medicine to make us over. We think we can put fertilizer in the ground and get maximum crops.

Now, to continue with our experiment. The land that was plowed early and thoroughly cultivated, yielded at the rate of $36\frac{1}{2}$ bushels of clean wheat to the acre; the land that was not plowed until two weeks before seeding, but otherwise treated exactly the same as the first section, yielded at the rate of 24 bushels to the acre, while the third lot plowed two days before seeding, yielded 17 bushels to the acre. You will see we were able to demonstrate just what we wanted to show to those farmers who were looking on, in a practical way, right before their noses, that early and late plowing does make a difference. This is the only way to demonstrate some things to some people, down in York county, Pennsylvania.

We tried these experiments on four different soils; soils derived from the Potsdam sandstone, the Cambrian limestone, the hydro-mica and the micaceous rock. It worked out everywhere in the same way except in the sandy soils and, do you know, where we did not plow at all, but cultivated well, the crop was the largest in these soils. We have but little of that sort of soil, and I was puzzled to know why a sandy soil should not need plowing, or why wheat should yield better in a soil of that nature when it was not plowed—only cultivated. I think I have the correct solution; wheat requires a compact soil into which it can thrust its roots and draw the fertility from the confined spaces around the grains of sand.

The fertility contained in the organic matter of which I was speaking this morning, becomes available very quickly in sandy

soils, in fact too quickly, whereas, this is not the case in loamy or clayey soil.

The next thing is seed selection. Those men back there were not only good farmers, but they found that seed selection was necessary. They had those old fanning mills with which they cleaned their wheat. You know what I mean? They did not think of going out into the field and selecting the best plants, but, after threshing their grain and before seeding, they put the wheat over the fanning mill which they ran with an engine. The farmers with whom I made these investigations about ten or twelve years ago did not know about seed selection; that is, they did not call it seed selection, but they would put their wheat on the fanning mill and every grain which did not weigh a certain amount—that is, the grains that were not of a certain weight, were blown out; and I have seen about one-third blown out, while the other two-thirds came out of the front of the mill. I asked one of these men to weigh the two kinds of grain—that coming in front of the mill and that under the mill, and we found there was a difference of between six and eight pounds in the weight of a bushel. Of course, only the heavy wheat was sown. This has been done year after year; no doubt long before I ever came in contact with them. Another thing, they found that certain kinds of wheat were adapted to certain soils. For our sandy upland soil, the Harvest King is the best variety of winter wheat. The Rural New Yorker No. 6 is the variety of wheat that yields best in our limestone soils, although the Turkish-Rumanian, a bearded variety, yields about as well.

These people of my state of Pennsylvania have illustrated, in a practical way, just what has been done, over and over, along scientific lines.

As I have already said, I do not know whether your soil or your climate are adapted to wheat raising, but it looks to me as if the State of Maine could raise spring wheat and probably winter wheat. Wheat is a crop that contains more food better adapted to nourish and maintain the human body than any other crop we raise. I do not except rice. Eighty-two per cent of wheat is digestible and that is about the digestibility of rice. Wheat contains all the mineral the blood and muscle and energy producing foods needed by the body. For these reasons

I think wheat should be grown wherever possible. I believe it should be eaten in the form of whole wheat bread. I believe there would be fewer bald headed men if the men would eat whole wheat bread—though, if this is a remedy, it is too late for some of you. The gentleman who made the address this afternoon said something that appealed to me, when he said, "We are not having the strong, healthy, vigorous men we used to have." I believe this is true. I am not the strong, vigorous man my ancestors were; I think this is true of the present generation, in general. I have a notion this is caused largely by the food we eat. If we ate whole wheat we would be stronger men and women than we are.



STATISTICS OF AGRICULTURAL SOCIETIES.

OFFICERS OF AGRICULTURAL SOCIETIES.

NAME OF SOCIETY.	President.	P. O. Address.	Secretary.	P. O. Address.	Treasurer.	P. O. Address.
Maine State Agricultural Society.	B. J. Libby.	Oakland.	J. L. Lowell.	Auburn.	T. F. Callahan.	Lewiston.
Eastern Maine Fair Association.	Albert S. Field.	Bangor, 60 Court St.	Sarah P. Emery.	Bangor, 24 Forest Ave.	Albert S. Field.	Bangor, 60 Court St.
Central Maine Fair Company.	S. E. Whitcomb.	Waterville.	R. M. Gilmore.	Waterville.	F. D. Robinson.	Waterville.
Maine State Pomological Society.	George A. Yeaton.	Norway.	G. L. White.	Rowdoinham.	T. E. Chase.	Buckfield.
Maine State Poultry Association.	George P. Coffin.	Freeport.	A. L. Merrill.	Auburn.	W. E. Scott.	Portland.
Androscoggin County.	John Look.	North Jay.	Charles D. Dyke.	Livermore Falls.	George W. Dyke.	Livermore Falls.
Androscoggin, Greene Town Fair Association.	E. B. Sanderson.	Greene, R. F. D. 2.	W. L. Mower.	Greene, R. F. D. 1.	B. P. Rackley.	Greene, R. F. D. 1.
Androscoggin, Leeds.	A. L. Thomas.	Leeds.	H. W. Lincoln.	Leeds.	W. B. House.	Leeds.
Androscoggin, Northern Maine Fair Association.	J. F. Guioi.	Presque Isle.	Ernest T. McGlaughlin.	Presque Isle.	John E. Bishop.	Presque Isle.
Androscoggin, Houlton.	Nathaniel Tompkins.	Houlton.	F. N. Vose.	Houlton.	Robert M. Lawlis.	Houlton.
Androscoggin, Caribou Trotting Park and Fair Association.	Frank Riley.	Caribou.	R. R. Ryder.	Caribou.	John S. Clark.	Caribou.
Cumberland County.	Charles W. Chaplin.	Gorham.	H. William Smith.	Gorham.	Harry C. Palmer.	Gorham.
Cumberland Farmers' Club.	A. W. Stanley.	Cumberland Ctr.	Willard Wilson.	Cumberland Ctr.	Willard Wilson.	Cumberland Ctr.
Cumberland, New Gloucester and Danville.	C. L. McCann.	New Gloucester.	J. P. Witham.	New Gloucester.	G. C. Jordan.	Upper Gloucester.
Cumberland, Freeport Poultry Assn.	A. Q. Carter.	Freeport.	George P. Coffin.	Freeport.	L. E. Curtis.	Freeport.
Cumberland, Little Ribby Park.	Sumner O. Hancock.	Casco.	Ernest U. Archibald.	West Poland.	Leland H. Poore.	Webbs Mills.
Cumberland, Bridgton.	W. S. Hazen.	Bridgton.	H. W. Jones.	Bridgton.	J. T. Bardsley.	Bridgton.
Franklin County.	Charles M. Hobbs.	West Farmington.	George D. Clark.	Farmington.	C. H. Pierce.	Farmington.
Franklin, North.	A. D. Graffan.	Phillips.	J. I. Harnden.	Phillips.	A. E. Bunnell.	Phillips.
Hancock County.	F. P. Merrill.	Bluehill.	N. L. Grindell.	South Penobscot.	M. R. Hinckley.	Bluehill.
Hancock, Eden.	Charles L. Shand.	Bar Harbor.	Juan Emery.	Salisbury Cove.	Charles F. King.	Eden.
Hancock, North Ellsworth Farmers Club.	Alvin E. Maddocks.	Ellsworth, R. F. D. 3.	H. F. Maddocks.	Ellsworth, R. F. D. 3.	Asa C. Flood.	Ellsworth Falls.
Kennebec, Coccinevagan.	H. H. Witherell.	Monmouth.	W. E. Reynolds.	Monmouth.	Charles H. Berry.	Monmouth.
Kennebec, South.	C. F. Donnell.	Weeks Mills.	Arthur N. Douglas.	Gardiner, R. F. D. 9.	Jasper S. Gray.	Windsorville.
Knox, North.	E. E. Thurston.	Union.	H. L. Grinnell.	Union.	George C. Hawes.	Union.
Lincoln County.	George D. Pastorius.	Newcastle.	J. A. Perkins.	Nobleboro.	H. E. Winslow.	Damariscotta.
Lincoln, Bristol.	E. J. Ervine.	Bristol.	George A. Ward.	Bristol.	C. B. Woodward.	Damariscotta.
Oxford County.	W. J. Wheeler.	South Paris.	W. O. Frothingham.	South Paris.	W. O. Frothingham.	South Paris.
Oxford, West.	Chas. W. Farrington.	Fryeburg.	B. Walker McKeon.	Fryeburg.	Alvin D. Merrill.	Fryeburg.
Oxford, Androscoggin Valley.	Ezra Keene.	Buckfield.	O. M. Richardson.	Canton.	G. L. Wadlin.	Canton.
Oxford, North.	Y. A. Thurston.	Andover.	John F. Talbot.	Andover.	Mathias Mooney.	Andover.

Oxford, West'm Maine Poultry Ass'n	Harry E. Lovejoy	Norway	E. P. Crockett	South Paris	South Paris.
Penobscot, West	E. M. Atkins	Dexter, R. F. D. 3	E. E. Colbath	Dexter, R. F. D. 3	Exeter
Penobscot, North	H. B. Lewis	Springfield	I. R. Averill	Prentiss	Springfield
Penobscot, Orrington	Chas. H. Chapman	So. Brewer, R. F. D. 1	F. F. Elmer King	South Brewer, R. F. D. 1	South Brewer, R. F. D. 1
Penobscot, Bangor Poultry Ass'n	John P. Webster	Bangor, Ave.	E. D. Baker	Bangor, Box 162.	Bangor, Box 162.
Piscataquis County	C. W. Hayes	Foxcroft	John A. Wilcox	Foxcroft	Foxcroft
Sagadahoc County	David Scribner	Topsham	Edwin C. Patten	Topsham	Brunswick
Sagadahoc, Richmond Farmers' and Mechanics' Club	U. G. Patten	Richmond	N. H. Skelton	Richmond	Richmond
Somerset County	B. F. Burns	Madison	J. F. Withee	Madison	Madison
Somerset, East	F. G. Burrill	Hartland	E. B. Libby	Hartland	Hartland
Somerset, Central	C. W. Day	Skowhegan	S. H. Bradbury	Skowhegan	Skowhegan
Somerset, Four County Fair Ass'n	C. A. Stevens	Pittsfield	John C. Gordon	Pittsfield	Pittsfield
Somerset, Embden	Fred Ward	North Anson, R. F. D. 1	Chester K. Williams	North Anson, R. F. D. 1	North Anson, R. F. D. 1
Somerset, Solon	Fred Magoon	Solon, R. F. D. 2	M. P. Pollard	Solon, R. F. D. 1	Solon, R. F. D. 2
Waldo and Penobscot	F. A. Littlefield	Monroe	F. H. Putnam	Monroe	Monroe
Waldo, Unity Park Association	J. H. Campbell	Plymouth	Edwin T. Reynolds	Unity	Unity
Waldo, Tranquility Grange	J. S. Mullin	Lincolnville	L. C. Rankin	Lincolnville	Lincolnville
Washington, West	R. M. Allen	Columbia Falls	W. S. Coffin	Harrington	Cherryfield
Washington, Machias Valley	William G. Means	Machias	Frank S. Ames	Machias	Machias
Washington, Calais Fair Ass'n	Fred V. Packard	Calais	D. J. Hansol	Calais	Calais
York, Shapleigh and Acton	Simon N. Ricker	Emery Mills	Fred K. Bodwell	Acton	Emery Mills
York, Cornish Agricultural Ass'n	O. W. Adams	Cornish	William R. Copp	Cornish	Cornish
York County Poultry Association	Robert Rankin	Sanford	L. C. Holmes	Sanford	Sanford

ANALYSIS OF EXHIBITIONS.

NAME OF SOCIETY.	Number of horses and colts.	Number of thoroughbred bulls and bull calves.	Number of thoroughbred cows, heifers and heifer calves.	Number of grade cows, heifers and heifer calves.	Number of oxen and steers.	Number of animals for beef.	Number of cattle shown in herds.	Total number of neat stock.	Number of sheep.	Number of swine.	Number of poultry (coops).
Maine State Agricultural Society.....	137	57	268	24	240	48	52	689	350	92	1,150
Eastern Maine Fair Association.....	43	45	121	-	-	14	14	194	132	30	500
Central Maine Fair Company.....	237	56	212	15	116	56	268	455	225	68	2,250
Maine State Pomological Society.....	-	-	-	-	-	-	-	-	-	-	-
Maine State Poultry Association.....	-	-	-	-	-	-	-	-	-	-	-
Androscoggin County.....	19	-	-	3	44	3	-	50	10	11	1,365
Androscoggin, Greene Town Fair Association.....	12	6	40	-	4	-	4	51	8	4	7
Androscoggin, Leeds.....	41	4	15	9	18	-	14	60	6	26	16
Aroostook, Northern Maine Fair Association.....	135	87	208	35	20	-	169	350	172	60	474
Aroostook, Houlton.....	50	52	91	20	6	8	8	177	50	12	65
Aroostook, Caribou Trotting Park and Fair Ass'n	13	9	21	4	-	-	-	34	1	8	225
Cumberland County.....	63	6	12	60	115	20	24	237	52	4	132
Cumberland Farmers' Club.....	4	8	18	9	50	4	4	93	12	4	-
Cumberland, New Gloucester and Danville.....	28	7	15	53	14	-	10	89	7	17	110
Cumberland, Freeport Poultry Association.....	3	-	-	-	-	-	-	-	-	-	532
Cumberland, Little Rigby Park.....	-	-	-	-	8	-	-	-	-	-	-
Cumberland.....	22	4	6	4	30	6	40	56	-	-	-
Franklin County.....	85	37	136	86	200	154	95	708	150	50	225
Franklin, North.....	80	7	23	100	80	15	44	250	30	13	125
Hancock County.....	10	5	1	37	20	2	-	65	-	-	13
Hancock, Eden.....	3	1	-	15	-	-	-	16	8	-	25
Hancock, North Ellsworth Farmers' Club.....	-	-	-	-	-	10	30	112	6	2	3
Kennebec, Cochenewagan.....	8	15	43	7	7	10	11	142	3	11	18
Kennebec, South.....	19	10	31	51	142	11	19	254	1	1	20
Knox, North.....	27	10	27	31	78	7	18	171	7	-	22

Lincoln County.....	20	5	11	18	64	4	10	112	-	3	16
Lincoln, Bristol.....	-	1	-	9	30	-	-	40	-	-	2
Oxford County.....	96	43	89	89	120	8	54	43	43	6	157
Oxford, West.....	75	17	76	100	220	30	62	447	12	-	36
Oxford, Androscoggin Valley.....	30	12	29	16	18	4	16	95	5	-	8
Oxford, North.....	18	4	7	17	30	4	18	62	14	31	14
Oxford, Western Maine Poultry Association.....	-	-	-	-	-	-	-	-	-	-	524
Penobscot, West.....	45	13	53	49	30	4	42	145	98	6	265
Penobscot, North.....	10	2	12	-	-	-	-	14	-	-	6
Penobscot, Orrington.....	8	2	-	8	-	-	8	18	-	-	3
Penobscot, Bangor Poultry Association.....	-	-	-	-	-	-	-	-	-	-	-
Piscataquis County.....	42	10	20	43	4	-	24	101	12	20	19
Sagadahoc County.....	83	45	273	82	124	52	120	524	179	57	495
Sagadahoc, Richmond Farmers' and Mechanics Club.....	-	-	-	-	-	-	-	-	-	-	-
Somerset County.....	12	1	6	9	6	-	6	28	-	-	5
Somerset, East.....	17	5	22	39	32	8	10	116	36	-	28
Somerset, Central.....	59	8	16	39	24	8	48	202	37	19	126
Somerset, Four County Fair Association.....	38	18	34	45	40	10	-	147	86	59	175
Somerset, Embden.....	41	18	51	28	20	14	40	171	86	21	180
Somerset, Solon.....	21	1	23	15	2	-	38	44	14	-	1
Somerset, Solon.....	14	1	6	9	8	14	6	26	14	-	-
Waldo and Penobscot.....	56	8	55	65	30	10	76	109	54	1	102
Waldo, Unity Park Association.....	94	24	72	59	40	29	78	224	12	20	32
Waldo, Tranquility Grange.....	12	-	3	10	2	-	3	18	3	3	10
Washington, West.....	25	9	19	27	17	-	6	78	35	24	26
Washington, Machias Valley.....	21	2	16	8	16	-	-	42	7	16	86
Washington, Calais Fair Association.....	9	8	16	21	-	-	9	54	-	3	150
York, Shapleigh and Acton.....	-	-	-	4	80	12	-	96	4	-	10
York, Cornish Agricultural Association.....	-	-	32	33	100	6	27	211	-	2	34
York County Poultry Association.....	-	-	-	-	-	-	-	-	-	-	489
Total.....	1,898	699	2,231	1,414	2,249	575	1,514	7,652	1,988	697	10,256

Lincoln, Bristol.....	33 00	23 00	12 00	-	-	36 00	-	40 00	69 00	141 00
Oxford County.....	25 00	35 00	17 00	-	-	-	-	40 00	20 00	60 00
Oxford, West.....	10 00	5 00	5 00	6 00	-	10 00	-	10 00	20 00	80 00
Oxford, Androscoggin Valley.....	-	3 00	3 00	-	-	6 00	-	-	-	2 50
Oxford, North.....	-	-	-	-	-	-	-	-	-	-
Oxford, Western, Maine Poultry Association.....	5 00	-	-	-	-	-	-	-	-	-
Penobscot, West.....	-	4 00	2 00	25 50	5 00	10 00	5 00	-	14 00	109 00
Penobscot, North.....	-	6 00	-	1 00	-	1 50	-	-	3 00	1 50
Penobscot, Orrington.....	-	-	-	-	-	4 50	-	-	3 00	-
Penobscot, Bangor Poultry Association.....	-	-	-	-	-	-	-	-	-	-
Piscataquis County.....	5 00	3 00	5 00	5 00	5 40	7 20	5 40	-	12 60	54 00
Sagadahoc County.....	15 00	10 00	20 00	14 00	-	8 00	-	-	36 00	118 00
Sagadahoc, Richmond Farmers' and Mechanics Club.....	-	-	-	-	-	-	-	-	-	-
Somerset County.....	5 00	6 00	1 00	-	-	-	-	-	2 25	5 75
Somerset, East.....	6 00	8 00	2 00	3 00	-	3 00	-	-	8 50	-
Somerset, Central.....	3 00	4 00	15 00	-	5 00	9 00	5 00	5 00	41 00	224 00
Somerset, Four County Fair Association.....	12 00	-	5 00	5 00	-	14 00	12 00	5 00	17 50	121 00
Somerset, Emden.....	-	-	8 00	5 00	-	5 00	-	-	26 50	140 00
Somerset, Solon.....	-	-	3 00	2 00	-	-	-	-	13 00	26 00
Somerset, Walden.....	-	-	-	-	-	-	-	-	10 50	-
Waldo and Penobscot.....	5 40	8 10	8 10	10 20	12 60	94 95	12 60	16 00	4 50	88 20
Waldo, Unity Park Association.....	17 00	6 00	6 00	12 00	16 00	8 00	16 00	2 00	27 50	32 00
Waldo, Tranquility Grange.....	-	-	3 50	-	-	3 75	-	-	4 50	5 00
Washington, West.....	-	-	-	-	-	30 00	-	-	40 00	119 00
Washington, Machias Valley.....	7 20	-	18 90	-	-	-	-	-	13 50	4 50
Washington, Calais Fair Association.....	-	-	22 00	6 00	-	5 00	-	-	10 00	12 00
York, Shapleigh and Acton.....	-	-	-	-	-	-	-	-	-	-
York, Cornish Agricultural Association.....	-	6 00	4 00	-	-	4 00	-	-	18 00	-
York County Poultry Association.....	-	-	-	-	-	-	-	-	-	-
	\$476 60	\$358 85	\$655 65	\$551 95	\$237 20	\$478 40	\$218 00	\$1,102 85	\$2,333 45	

AGRICULTURE OF MAINE.

ANALYSIS OF AWARDS—Continued.

NAME OF SOCIETY.	Amount of premiums awarded thoroughbred bulls and bull calves.	Amount of premiums awarded thoroughbred cows, heifers and heifer calves.	Amount of premiums awarded grade cows, heifers and heifer calves.	Amount of premiums awarded herds.	Amount of premiums awarded working oxen and steers.	Amount of premiums awarded matched oxen and steers.	Amount of premiums awarded trained steers.	Amount of premiums awarded beef cattle.	Amount of premiums awarded town teams.	Amount of premiums awarded oxen and steers for draft.
Maine State Agricultural Society.....	\$296 00	\$308 00	\$176 00	\$170 00	\$32 00	\$60 00	\$20 00	\$84 00	\$174 00	\$234 00
Eastern Maine Fair Association.....	172 00	412 00	—	132 00	—	—	—	50 00	—	—
Central Maine Fair Company.....	376 00	501 50	27 50	287 00	86 00	112 50	15 00	186 00	106 00	212 00
Maine State Pomological Society.....	—	—	—	—	—	—	—	—	—	—
Maine State Poultry Association.....	—	—	—	—	—	—	—	—	—	—
Androscoggin County.....	—	—	8 00	—	9 00	22 00	10 00	10 00	22 00	32 00
Androscoggin, Greene Town Fair Association.....	2 30	7 95	—	—	—	—	—	—	—	—
Androscoggin, Leeds.....	2 00	3 75	8 80	—	—	—	—	—	—	—
Aroostook, Northern Maine Fair Association.....	514 00	1,060 00	107 00	278 00	—	62 00	—	—	—	25 00
Aroostook, Houlton.....	225 00	400 00	73 00	107 00	—	20 00	—	38 00	—	—
Aroostook, Caribou Trotting Park and Fair Association.....	20 00	63 00	9 00	—	—	—	—	—	—	—
Cumberland County.....	8 00	32 00	276 00	—	32 00	48 00	25 00	52 00	22 00	128 00
Cumberland Farmers' Club.....	19 00	31 00	17 00	5 00	33 00	20 00	—	9 00	27 00	65 00
Cumberland, New Gloucester and Danyville Cumberland, Freeport Poultry Association.....	9 50	32 00	32 00	8 00	10 00	—	—	—	—	16 00
Cumberland, Little Rigby Park.....	—	5 00	10 00	—	—	—	—	—	—	—
Cumberland, North Bridgton.....	12 00	8 00	8 00	24 00	30 00	18 00	4 00	10 00	12 00	48 00
Franklin County.....	81 50	188 00	100 00	89 50	33 00	113 00	6 00	42 00	175 00	135 00
Franklin, North.....	8 50	16 05	29 80	30 00	4 50	8 75	—	11 50	18 00	30 00
Hancock County.....	20 00	2 00	61 00	10 00	33 50	—	—	5 00	20 00	28 00
Hancock, Eden.....	5 00	—	12 00	—	—	—	—	—	—	—
Hancock, North Ellsworth Farmers' Club.....	—	—	—	—	—	—	—	—	—	—
Kennebec, Cochaewagan.....	4 40	12 80	2 00	15 00	—	4 50	—	2 00	—	4 30
Kennebec, South.....	30 00	32 00	29 50	18 00	26 50	26 75	8 00	18 25	42 00	32 25
Knox, North.....	20 00	44 25	51 75	17 00	23 50	14 00	—	5 00	41 00	47 00

Lincoln County.....	10 00	12 75	13 75	8 00	-	6 75	15 00	-	5 25	-	108 00
Lincoln, Bristol.....	5 00	-	4 25	-	-	148 00	68 00	-	28 00	88 00	303 00
Oxford County.....	191 00	193 00	195 00	113 00	-	85 75	100 00	20 00	36 00	120 00	150 00
Oxford, West.....	70 00	150 00	85 00	150 00	-	8 00	24 00	3 00	5 00	20 00	58 00
Oxford, Androscoggin Valley.....	18 00	30 00	12 00	18 00	-	20 00	6 00	-	2 00	4 00	-
Oxford, North.....	10 50	14 50	12 00	15 00	-	-	-	-	-	-	-
Oxford, Western Maine Poultry Association.....	-	-	-	-	-	-	-	-	-	-	-
Penobscot, West.....	41 00	132 50	71 00	42 00	-	37 00	13 00	9 00	8 00	-	-
Penobscot, North.....	6 00	5 00	10 00	-	-	-	-	-	-	-	-
Penobscot, Orrington.....	4 00	-	8 50	6 00	-	-	-	-	-	-	-
Penobscot, Bangor Poultry Association.....	-	-	-	-	-	-	-	-	-	-	-
Piscataquis County.....	18 00	31 75	-	21 60	-	-	3 60	-	-	-	-
Sagadahoc County.....	180 00	672 75	130 85	130 00	-	36 00	30 00	8 00	68 00	48 00	240 00
Sagadahoc, Richmond Farmers' and Mechanics' Club.....	1 00	4 45	2 65	1 00	-	1 80	-	-	-	-	-
Somerset County.....	4 75	15 50	27 00	6 00	-	10 00	6 50	-	5 50	10 00	28 00
Somerset, East.....	35 00	53 00	48 00	29 00	-	32 00	15 00	-	18 50	-	-
Somerset, Central.....	55 00	102 00	89 00	88 00	-	25 00	19 00	-	10 00	40 00	-
Somerset, Four County Fair Association.....	66 00	165 00	66 00	88 00	-	37 50	8 00	-	22 00	35 00	40 00
Somerset, Embden.....	11 00	12 00	3 00	12 00	-	2 00	-	-	-	-	-
Somerset, Solon.....	1 00	4 00	7 00	5 00	-	6 00	-	-	-	-	-
Somerset and Penobscot.....	13 00	156 60	76 50	72 00	-	16 20	16 20	8 10	15 30	14 40	74 70
Waldo, Unity Park Association.....	42 00	55 00	40 25	87 00	-	19 00	21 00	7 50	35 00	12 00	30 00
Waldo, Tranquility Grange.....	-	-	7 50	7 00	-	2 00	-	-	-	-	-
Washington, West.....	57 00	95 00	91 00	10 00	-	-	49 00	-	-	-	26 00
Washington, Machias Valley.....	9 00	42 60	13 50	-	-	8 00	-	12 60	-	-	15 00
Washington, Calais Fair Association.....	48 00	184 00	44 00	20 00	-	-	-	-	-	-	-
York, Shapleigh and Acton.....	-	-	4 75	-	-	6 00	32 75	-	6 00	35 00	12 00
York, Cornish Agricultural Association.....	-	-	-	-	-	126 00	54 00	7 00	18 00	60 00	77 00
York County Poultry Association.....	46 00	129 00	70 00	30 00	-	-	-	-	-	-	-
	\$2,767 45	\$5,423 70	\$2,170 85	\$2,061 10	-	\$986 00	\$1,010 55	\$163 20	\$805 30	\$1,145 40	\$2,208 25

ANALYSIS OF AWARDS—Concluded.

NAME OF SOCIETY.	Awarded sheep.	Awarded swine.	Amount of premiums awarded poultry.	Amount of premiums awarded grain and root crops.	Amount of premiums awarded fruit and flowers.	Amount of premiums awarded bread and dairy products.	Amount of premiums awarded honey, sugar and syrups.	Amount of premiums awarded agricultural implements.	Amount of premiums awarded household manufacturers and needle-work.	Amount of premiums awarded objects not named above.	Total amount and gratuities awarded.
Maine State Agricultural Society...	\$764 00	\$129 00	\$520 95	\$114 00	\$306 00	\$290 00	\$31 00	-	\$231 00	\$375 00	\$4,811 95
Eastern Maine Fair Association...	152 00	53 00	197 95	176 50	232 00	6 50	-	-	218 60	399 00	2,371 05
Central Maine Fair Company...	614 00	142 00	901 50	74 50	172 25	292 00	45 00	-	324 74	475 00	5,546 49
Maine State Pomological Society...	-	-	-	-	513 50	-	-	-	-	-	513 50
Maine State Poultry Association...	-	-	1,436 30	-	-	-	-	-	-	-	1,436 30
Androscoggin County...	4 00	4 00	8 25	1 50	13 25	2 00	-	-	67 55	-	1,286 55
Androscoggin, Greene Town Fair Association...	2 25	1 00	5 00	13 55	11 90	10 00	1 00	-	10 85	18 60	111 15
Androscoggin, Leeds...	1 15	1 00	2 75	16 75	6 00	3 55	-	-	16 60	8 00	113 35
Aroostook, Northern Maine Fair Association...	525 00	227 00	364 50	183 55	151 50	100 75	18 00	-	288 05	461 35	5,098 70
Aroostook, Houlton...	98 00	26 50	230 00	92 00	30 00	12 00	16 00	-	248 45	107 60	2,114 55
Aroostook, Caribou Trotting Fair and Fair Association...	4 50	3 00	183 40	63 50	18 00	12 00	12 50	-	111 40	23 25	566 05
Cumberland County...	31 00	2 00	138 35	23 00	53 55	40 00	51 30	-	41 10	60 00	1,365 30
Cumberland Farmers' Club...	12 00	10 00	65 00	19 50	14 30	14 75	75	-	55 40	41 75	512 45
Cumberland, New Gloucester and Danville...	7 00	21 00	45 75	28 75	13 10	9 00	2 50	-	40 80	20 00	352 90
Cumberland, Freeport Poultry Association...	-	-	417 12	-	-	-	-	-	-	-	417 12
Cumberland, Little Rigby Park...	-	-	-	2 10	12 00	6 20	2 80	-	10 00	50 00	97 00
Cumberland, Bridgton...	168 75	16 00	126 15	15 25	48 70	57 60	29 30	-	68 00	70 00	421 10
Franklin County...	15 25	2 00	56 60	19 10	6 85	3 15	2 75	-	103 85	61 00	1,880 90
Franklin, North...	-	10 50	35 20	30 20	40 75	38 70	1 50	-	40 60	6 75	351 65
Hancock County...	-	4 00	19 05	70 15	30 00	5 00	-	-	50 30	38 00	414 45
Hancock, Eden...	3 00	-	-	-	-	-	-	-	25 85	7 00	181 05

Hancock, North Ellsworth Farmers' Club	5 00	-	2 00	3 00	18 00	24 00	75	50	-	18 25	-	69 50
Kennebec, Cochenewagan	-	2 00	9 50	29 00	24 00	16 00	4 00	-	-	19 00	-	166 00
Kennebec, South	4 00	2 00	12 30	26 15	15 60	15 60	7 10	1 75	-	41 30	11 00	408 20
Knox, North	4 50	-	17 25	37 25	39 15	39 15	4 50	4 75	-	32 20	10 88	482 73
Lincoln County	-	4 75	13 00	30 50	30 05	30 05	7 00	3 25	-	42 20	5 00	360 25
Lincoln, Bristol	-	-	2 00	9 25	6 45	6 45	1 75	5 00	1 75	24 70	-	65 15
Oxford County	44 00	24 00	218 00	76 25	334 50	334 50	26 50	25 50	33 00	116 50	439 00	2,981 25
Oxford, West	30 75	-	40 25	36 44	12 00	12 00	6 25	10 00	-	130 75	350 00	1,805 19
Oxford, Androscoggin Valley	4 00	-	8 00	12 75	18 75	18 75	10 25	3 00	3 00	14 50	164 25	590 50
Oxford, North	8 00	18 00	6 00	12 00	10 00	10 00	10 00	6 00	-	30 50	6 64	205 64
Oxford, Western Maine Poultry Association	-	-	605 44	-	-	-	-	-	-	-	-	605 44
Penobscot, West	95 00	14 00	74 00	50 30	45 90	45 90	17 65	10 00	-	69 00	90 77	1,000 62
Penobscot, North	-	-	3 00	25 00	50 00	50 00	3 50	-	-	41 85	5 00	161 35
Penobscot, Orrington	-	-	1 75	9 65	10 95	10 95	1 50	1 25	-	72 75	4 25	131 60
Penobscot, Bangor Poultry Ass'n	-	-	738 90	-	-	-	-	-	-	-	-	738 90
Piscataquis County	7 20	3 60	6 75	5 00	5 40	5 40	5 00	2 00	-	11 70	9 27	239 77
Sagadahoc County	212 00	81 75	286 75	205 50	140 75	140 75	74 75	10 91	-	127 50	291 91	3,196 42
Sagadahoc, Richmond Farmers' and Mechanics' Club	-	-	80	10 65	7 75	7 75	2 40	3 40	-	21 65	7 70	74 25
Somerset County	18 75	-	10 00	6 10	4 00	4 00	50	-	-	16 20	3 30	199 60
Somerset, East	86 50	45 00	89 25	31 00	12 00	12 00	9 25	1 00	-	23 15	42 70	886 35
Somerset, Central	185 00	23 00	151 50	37 00	9 75	9 75	24 75	5 00	-	76 75	56 00	1,095 25
Somerset, Four County Fair Ass'n	151 00	15 00	209 00	36 50	11 25	11 25	9 75	1 75	-	268 71	-	1,481 96
Somerset, Embden	5 00	-	-	-	-	-	-	-	-	9 00	98 00	98 00
Somerset, Solon	-	-	37 25	54 50	56 25	56 25	19 75	-	-	111 20	48 45	40 50
Waldo and Penobscot	54 90	4 50	20 00	32 00	14 75	14 75	10 50	8 25	-	92 75	119 25	1,095 50
Waldo, Unity Park Association	5 00	5 00	20 00	19 00	14 50	14 50	1 50	18 50	6 00	16 00	15 00	817 50
Waldo, Tranquility Grange	1 50	3 50	4 75	84 00	44 40	44 40	1 00	-	-	144 80	-	114 00
Washington, West	83 00	25 50	40 45	84 00	44 40	44 40	8 15	-	-	112 07	26 20	940 15
Washington, Machias Valley	9 90	38 20	104 15	72 88	84 15	84 15	13 00	2 50	-	97 50	41 75	612 00
Washington, Calais Fair Ass'n	-	6 00	115 75	79 35	52 25	52 25	8 00	-	-	27 00	75 00	756 60
York, Shapleigh and Acton	2 00	8 00	18 00	75 00	55 00	55 00	8 00	-	-	41 60	-	356 50
York, Cornish Agricultural Ass'n	-	-	62 00	8 00	7 50	7 50	3 75	21 50	-	-	-	807 35
York County Poultry Association	-	-	489 35	-	-	-	-	-	-	-	-	489 35
Total	\$3,418 90	\$965 30	\$8,127 26	\$2,077 92	\$2,806 70	\$1,196 30	\$360 21	\$43 75	\$1,319 33	\$3,566 51	\$52,036 93	

FINANCES.

NAME OF SOCIETY.

Amount received
from State.Receipts for
membership.

Receipts from loans.

Receipts from entry
fees for trotting
purses.Receipts from all
other sources.

Total receipts.

Maine State Agricultural Society.....	\$2,500 00	\$20 00	\$4,500 00	\$1,280 00	\$11,432 78	\$19,732 78
Eastern Maine Fair Association.....	1,750 00	-	1,124 38	419 50	9,383 56	12,677 44
Central Maine Fair Company.....	2,500 00	-	-	809 40	14,659 23	17,968 63
Maine State Pomological Society.....	1,902 01	81 00	-	-	939 02	2,922 03
Maine State Poultry Association.....	875 87	93 00	-	-	1,281 35	2,250 22
Androscoggin County.....	-	-	-	-	1,016 20	1,016 20
Androscoggin, Greene Town Fair Association.....	40 41	-	-	10 00	209 81	260 22
Androscoggin, Leeds.....	-	35 00	-	-	103 73	138 73
Aroostook, Northern Maine Fair Association.....	1,921 13	41 00	15,000 00	1,573 86	14,513 07	33,049 06
Aroostook, Houlton.....	1,021 29	25 00	1,000 00	411 50	9,890 88	12,348 67
Aroostook, Caribou Trotting Park and Fair Association.....	141 05	-	-	1,040 00	4,883 70	6,064 75
Cumberland County.....	399 15	20 00	-	447 50	5,010 33	5,876 98
Cumberland Farmers' Club.....	116 59	25 50	-	330 00	2,170 51	2,702 60
Cumberland, New Gloucester and Danville.....	126 86	40 00	275 00	142 00	1,538 40	2,122 26
Cumberland, Freeport Poultry Association.....	250 94	21 50	50 00	-	343 12	665 56
Cumberland, Little Rigby Park.....	56 85	-	-	138 75	769 40	965 00
Cumberland, Bridgton.....	109 98	-	-	420 00	1,524 80	2,054 80
Franklin County.....	672 29	803 00	-	-	6,770 78	8,246 07
Franklin, North.....	134 26	302 00	-	176 25	1,341 33	1,953 84
Hancock County.....	190 53	-	-	345 50	1,780 78	2,316 81
Hancock, Eden.....	91 05	-	-	30 00	1,415 81	1,536 86
Hancock, North Ellsworth Farmers' Club.....	44 47	6 00	-	-	331 86	382 33
Kennebec, Cochenewagon.....	-	-	-	-	236 32	236 32
Kennebec, South.....	141 19	-	-	14 00	1,098 95	1,254 14
Knox, North.....	199 25	-	625 00	20 00	2,191 42	3,035 67

Lincoln County.....	140 76	2 00	-	-	1,076 22	1,818 98
Lincoln, Bristol.....	21 99	75	-	-	302 31	325 05
Oxford County.....	1,200 97	18 00	900 00	-	6,896 58	9,710 55
Oxford, West.....	672 83	210 00	-	-	3,729 23	5,212 06
Oxford, Androscoggin Valley.....	334 40	-	-	-	1,916 89	2,631 29
Oxford, North.....	150 31	-	-	-	738 10	983 41
Oxford, Western Maine Poultry Association.....	373 45	10 50	6 61	-	583 50	974 06
Penobscot, West.....	419 61	40 00	-	-	3,013 50	3,783 11
Penobscot, North.....	69 03	1 00	-	-	300 00	1,000 00
Penobscot, Orrington.....	47 88	-	-	-	829 97	1,000 79
Penobscot, Bangor Poultry Association.....	324 62	32 00	500 00	-	863 91	1,000 79
Piscataquis County.....	88 57	-	-	-	216 20	1,439 82
Sagadahoc County.....	1,245 73	50 00	2,820 66	-	1,166 35	1,254 92
Sagadahoc, Richmond Farmers' and Mechanics' Club.....	27 60	100 00	46 80	857 50	8,161 46	13,135 35
Somerset County.....	181 34	-	67 70	-	174 40	701 70
Somerset, East.....	275 08	-	700 00	100 00	409 66	701 70
Somerset, Central.....	422 98	10 00	500 00	25 00	1,726 67	2,726 75
Somerset, Four County Fair Association.....	372 97	-	650 00	423 75	4,125 52	5,482 25
Somerset, Embden.....	38 20	-	14 17	496 25	2,899 02	4,418 24
Somerset, Solon.....	45 67	-	17 08	-	71 01	1,133 47
Waldo and Penobscot.....	426 42	-	-	210 25	7 75	40 50
Waldo, Unity Park Association.....	252 96	-	-	115 00	2,020 43	2,666 10
Waldo, Tranquility Grange.....	34 81	3 00	-	135 10	1,345 00	1,742 96
Washington, West.....	331 86	-	58 30	-	-	131 21
Washington, Machias Valley.....	178 97	-	500 00	377 50	2,816 66	4,026 02
Washington, Calais Fair Association.....	332 03	-	400 00	1 50	3,490 01	4,070 48
York, Shapleigh and Acton.....	149 94	173 00	1,000 00	900 00	2,513 30	4,745 33
York, Cornish Agricultural Association.....	377 27	-	60 00	-	10 63	393 37
York County Poultry Association.....	347 02	16 00	320 00	530 00	2,430 37	3,637 64
			-	177 30	707 00	1,247 32
	\$24,073 53	\$2,179 25	\$31,135 70	\$14,822 41	\$149,304 41	\$221,515 30

FINANCES—Concluded.

NAME OF SOCIETY.	Amount expended in improvements.	Amount expended in trotting purses.	Expenses during the fair.	Amount expended for all other purposes.	Total amount paid out including premiums and gratuities.	Value of property belonging to the society.	Amount of liabilities.
Maine State Agricultural Society.....	\$1,500 00	\$3,100 00	\$6,553 44	\$4,309 16	\$20,274 55	\$62,000 00	\$16,500 00
Eastern Maine Fair Association.....	800 00	1,717 00	2,707 62	3,831 77	10,927 44	40,000 00	3,400 00
Central Maine Fair Company.....	500 00	2,252 50	7,644 78	1,532 39	17,476 16	-	3,500 00
Maine State Pomological Society.....	-	-	-	1,471 99	1,985 49	-	-
Maine State Poultry Association.....	32 00	305 00	-	-	1,468 30	1,793 57	600 00
Androscoggin County.....	60 00	22 00	197 58	68 90	918 03	1,000 00	-
Androscoggin, Greene Town Fair Association.....	-	-	129 45	6 60	269 20	-	-
Androscoggin, Leeds.....	-	-	57 02	-	170 37	-	-
Aroostook, Northern Maine Fair Association.....	4,756 23	3,400 00	1,786 22	15,009 76	30,020 91	50,000 00	15,000 00
Aroostook, Houlton.....	73 83	2,294 00	3,408 97	4,169 73	12,061 08	14,000 00	8,000 00
Aroostook, Caribou Trotting Park and Fair Association.....	-	1,687 50	2,775 90	-	5,029 45	30,158 54	14,005 56
Cumbeiland County.....	300 00	1,850 00	1,568 30	474 11	5,557 71	6,000 00	500 00
Cumbeiland Farmers' Club.....	117 50	875 00	6,294 94	322 97	2,520 86	3,000 00	300 00
Cumbeiland, New Gloucester and Danville.....	18 48	465 00	349 16	727 75	2,005 34	-	-
Cumbeiland, Freeport Poultry Association.....	41 33	513 50	122 97	126 00	684 57	300 00	50 00
Cumbeiland, Little Rigby Park.....	-	1,200 00	292 15	48 00	991 98	2,000 00	30 00
Cumbeiland, Bridgton.....	-	-	1,558 39	-	1,821 10	3,200 00	150 00
Franklin County.....	-	950 00	84 32	2,107 19	6,496 48	20,000 00	-
Franklin, North.....	52 00	425 00	84 32	1,399 55	2,342 52	2,500 00	2,350 00
Hancock County.....	485 33	1,065 00	414 13	150 00	2,528 91	2,000 00	-
Hancock, Eden.....	75 00	280 00	398 46	55 85	990 36	2,500 00	1,150 00
Hancock, North Ellsworth Farmers' Club.....	112 50	-	73 08	10 00	265 08	2,000 00	50 00
Kennebec, Cochenewagan.....	-	-	48 49	-	214 49	-	-
Kennebec, South.....	-	162 50	369 75	326 25	1,266 70	1,500 00	700 00
Knox, North.....	600 00	532 50	664 00	449 75	2,728 98	1,500 00	625 00

Lincoln County.....	-	51 25	306 00	309 69	843 04	1,818 98	2,000 00	-
Lincoln, Bristol.....	-	173 31	-	173 31	37 00	326 71	1,200 00	187 16
Oxford County.....	1,705 54	1,255 23	1,740 00	1,255 23	2,024 46	9,706 48	15,000 00	1,500 00
Oxford, West.....	350 00	450 00	1,500 00	450 00	75 00	4,180 19	8,000 00	900 00
Oxford, Androscoggin Valley.....	-	290 00	950 00	290 00	663 89	2,494 39	6,000 00	2,400 00
Oxford, North.....	100 00	300 00	300 00	256 00	75 00	936 64	1,500 00	150 00
Oxford, Western Maine Poultry Association.....	5 26	132 42	132 42	-	157 72	900 84	1,400 00	-
Penobscot, West.....	613 00	775 00	775 00	400 10	640 63	3,429 35	6,000 00	5,000 00
Penobscot, North.....	200 00	450 00	450 00	387 14	-	1,108 49	3,000 00	900 00
Penobscot, Orrington.....	75 00	263 75	263 75	110 00	495 56	1,075 91	1,200 00	894 38
Penobscot, Bangor Poultry Association.....	38 30	-	428 25	427 00	-	1,204 20	-	2,800 00
Piscataquis County.....	-	38 30	-	447 79	-	1,115 81	3,000 00	1,516 40
Sagadahoc County.....	500 00	500 00	1,950 00	3,217 35	2,825 99	11,989 76	10,000 00	-
Sagadahoc, Richmond Farmers' and Mechanics' Club.....	-	-	-	36 00	24 50	134 75	-	-
Somerset County.....	29 55	275 00	275 00	54 20	203 35	761 70	1,000 00	690 00
Somerset, East.....	-	553 75	553 75	574 74	711 91	2,726 75	2,200 00	2,097 00
Somerset, Central.....	215 00	992 50	992 50	1,401 82	1,169 05	4,873 62	8,000 00	3,500 00
Somerset, Four County Fair Association.....	1,591 93	1,305 00	1,305 00	1,168 19	-	5,547 08	5,658 39	6,734 36
Somerset, Embden.....	-	-	-	-	25 47	123 47	5 00	9 17
Somerset, Solon.....	-	-	-	-	-	40 50	-	-
Waldo and Penobscot.....	57 02	550 00	550 00	811 93	-	2,514 45	4,000 00	1,900 80
Waldo, Unity Park Association.....	100 00	725 00	725 00	300 00	-	1,942 50	-	299 52
Waldo, Tranquility Grange.....	12 00	-	-	25 00	-	151 00	2,000 00	-
Washington, West.....	278 97	1,200 00	1,200 00	2,439 32	360 18	5,218 62	1,926 00	2,750 00
Washington, Machias Valley.....	25 00	857 49	857 49	1,747 81	436 45	3,678 75	-	400 00
Washington, Calais Fair Association.....	357 25	1,500 00	1,500 00	2,131 48	-	4,745 33	6,000 00	5,000 00
York, Shapleigh and Acton.....	-	-	-	731 44	35 75	392 25	2,000 00	-
York, Cornish Agricultural Association.....	116 98	1,200 00	1,200 00	731 44	519 00	3,374 77	4,500 00	320 00
York County Poultry Association.....	450 00	-	-	281 88	31 38	1,252 61	700 00	-
Total.....	\$16,706 78	\$41,050 66	\$51,324 54	\$47,453 05	\$208,571 96	\$340,741 50	\$107,429 35	



ANNUAL REPORT

OF THE

State Pomological Society

1916

MAINE STATE POMOLOGICAL SOCIETY.

OFFICERS FOR 1916.

President.

G. A. YEATON, Norway

Vice-Presidents.

H. P. SWEETSER, Cumberland Center
LYMAN K. LEE, Foxcroft

Secretary.

E. L. WHITE, Bowdoinham

Treasurer.

T. E. CHASE, Buckfield

Executive Committee.

THE PRESIDENT, FIRST VICE-PRESIDENT, SECRETARY AND
TREASURER, *ex officio.*

H. L. KEYSER, Greene
F. H. MORSE, Waterford
E. F. HITCHINGS, Orono

Members Experiment Station Council.

HOWARD L. KEYSER, Greene

Vice-President N. E. Fruit Show.

W. H. CONANT, Buckfield

Trustees.

Androscoggin County—A. H. CONANT,	Auburn
Cumberland County—H. P. SWEETSER,	Cumberland Center
Franklin County—Miss LIZZIE E. BASS,	Wilton
Hancock County—C. L. MORANG,	Ellsworth
Kennebec County—CLEMENT & TAYLOR,	Winthrop
Knox County—FRED A. GLEASON,	Union
Lincoln County—W. C. FORD,	Whitefield
Oxford County—A. A. HERRICK,	Norway
Penobscot County—ERNEST PAGE,	East Corinth
Piscataquis County—LYMAN LEE,	Foxcroft
Sagadahoc County—T. W. SKELTON,	Bowdoinham
Somerset County—R. T. PATTEN,	Skowhegan
Waldo County—HARRY W. LITTLEFIELD,	Brooks
Washington County—DAVID CAMPBELL,	Cherryfield
York County—C. E. FELCH,	Limerick

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MEMBERS OF THE SOCIETY.

LIFE MEMBERS.

Allen, W. H.	Buckfield	Hinds, W. C.	Winthrop
Andrews, Charles E.	Auburn	Hitchings, E. F.	Orono
Atherton, Wm. P.	Hallowe	Hoyt, Mrs. Frances.	Winthrop
Atkins, Charles G.	Bucksport	Jackson, F. A.	Winthrop
Averill, David C.	Temple	Keene, Charles S.	Turner
Bailey, W. G.	Freeport	Keyser, Howard L.	Greene
Bennoch, John E.	Orono	Lang, Ivan E.	Augusta
Bickford, Lewis I.	Dixmont Center	Lapham, E. A.	Pittston
Bisbee, George E.	Auburn	Leavitt, L. C.	Kezar Falls
Bisbee, Stanley.	Rumford Falls	Lee, Lyman K.	Foxcroft
Blaisdell, A. L.	Winterport	Lincoln, E. L.	Wayne
Blossom, O. E.	Turner Center	Litchfield, J. H.	Auburn
Bowman, H. G.	Hebron	Littlefield, Harry W.	Brooks
Briggs, John.	Turner	Lombard, Thurston M.	Auburn
Burleigh, Miss Clara M.	Vassalboro	Lord, J. Merrill.	Kezar Falls
Burr, John.	Freeport	Luce, Willis A.	Mabton, Wash.
Butler, Charles M.	Wiscasset	Macauley, T. B.	Montreal, Can.
Butler, Alonzo.	Union	Martin, John J., 270 Center St.	Bangor
Butman, J. W.	Readfield	McAllister, Zaccheus.	West Lovell
Chadbourne, C. L.	North Bridgton	McCabe, George L.	North Bangor
Chandler, Mrs. Lucy A.	Freeport	McLaughlin, Mrs. Edna G.	Exeter
Chase, Henry M., 103 Federal St.	Portland	McLaughlin, Henry.	Bangor
Chase, Homer N.	Auburn	Merrill, H. H.	Hebron
Chase, Thomas E.	Buckfield	Merrill, Oliver F.	Gardiner
Clement & Taylor.	Winthrop	Merrill, Rupert B.	Gardiner
Conant, A. A.	Hebron	Millsbaugh, L. H.	Winthrop
Conant, E. E.	Hebron	Mitchell, Frederick H.	Turner
Conant, Geo. I.	Hebron	Mitchell & Co.	Waterville
Conant, H. L.	Hebron Station	Moody, Charles H.	Turner
Conant, W. H.	Buckfield	Moody, J. F.	Hebron
Conant, W. G.	Hebron	Moore, William G.	Monmouth
Corbett, Herman.	Farmington	Moor, F. A.	Waterville
Crowell, Mrs. Ella H.	Skowhegan	Morse, F. H.	Waterford
Crowell, John H.	Farmington	Morse, W. J.	Orono
Dana, Woodbury S.	Westbrook	Newell, G. E.	Turner
Dawes, S. H.	Harrison	Page, E. E.	East Corinth
Dearborn, Hall C.	Hampden Highlands	Page, F. W.	Augusta
DeCoster, Virgil P.	Buckfield	Palmer, George L.	Kent's Hill
Dennisson, Mrs. Cora M.	Harrison	Parsons, Howard G.	Turner Center
DeRocher, Peter.	Bradentown, Fla.	Patten, Mrs. E. C.	Topsham
Dirwanger, Joseph A.	Portland	Prince, Edward M.	West Farmington
Douglass, C. S.	Douglass Hill	Pope, Charles S.	Manchester
Dunham, W. W.	North Paris	Pulsifer, D. W.	Poland
Emerson, Charles L.	South Turner	Richards, John T.	Gardiner
Farnsworth, B. B.	Portland	Ricker, A. S.	Turner
Felch, Chas. E.	Limerick	Ricker, Fred P.	Turner
Fish, Mrs. Benj.	Winterport	Roak, George M.	Auburn
Flint, John M.	West Baldwin	Robinson, W. C.	North Anson
French, H. C.	Rumford Center	Rogers, Mrs. Jeannette.	North Newburg
Frost, Oscar F.	Monmouth	Sawyer, Andrew S.	Cape Elizabeth
Gardiner, Robert H.	Gardiner	Sawyer, Charles F.	Hebron
George, C. H.	Hebron	Saunders, Ernest.	Lewiston
Goddard, Lewis C.	Woodfords	Seavey, Mrs. G. M.	Auburn
Grover, Franklin D.	Bean	Skillings, C. W.	North Auburn
Gulley, Alfred G.	Storrs, Conn.	Smith, Frederick O.	New Vineyard
Gurney, F. E.	Hebron	Smith, V. N.	Buckfield
Hackett, E. C.	West Gloucester	Stanley, H. O.	Winthrop
Hall, Mrs. H. A.	Brewer	Staples, George W., 904 Main St.	Hartford, Conn.
Hardy, E. E.	Farmington	Stilphen, Asbury C.	Gardiner
Hardy, Walter M.	Brewer	Strout, Charles S.	Biddeford
Haves, William.	Gardiner	Supt. Maine Sanatorium Farm.	Hebron
Heald, U. H.	Paris	Sweetser, F. R.	Cumberland Center
Herrick, A. A.	Norway	Taylor, Miss L. L. (Lakeside)	Belgrade

Thomas, William W.	Portland	Waugh, F. A.	Amherst, Mass.
Thomas, D. S.	North Auburn	Weston, Joseph.	Gardiner
Thurston, Edwin.	West Farmington	Wheeler, Charles E.	Chesterville
Townsend, Mrs. B. T.	Freeport	White, Charles M.	Bowdoinham
True, John W.	New Gloucester	White, Mrs. Annie.	Bowdoinham
Twitchell, George M.	Auburn	White, Edward L.	Bowdoinham
Vickery, H. E.	Hebron	Whitman, L. E.	Hebron
Verrill, Harry M.	Portland	Woods, Charles D.	Orono
Verrill, James.	Portland	Wright, Frederick.	Bath
Walker, Charles S.	Peru	Yeaton, George A.	Augusta
Walker, Elmer V.	Oxford	Yeaton, Samuel F.	West Farmington
Waterman, Willard H.	East Auburn		

ANNUAL MEMBERS FOR 1916.

Bass, Lizzie E.	Wilton	Irish, I. C., Dr.	Bowdoinham
Bass, Mary A.	Wilton	Merrill, Leon S.	Orono
Bowers, J. W. D., 732 Congress St.,	Portland	Mitchell, E. W.	Stuyvesant Falls, N. Y.
Brown, Sydney F.	West Sumner	Mitchell, W. S., 73 Concord St.,	Woodfords
Bryant, C. A.	Livermore Falls	Mosher, C. M.	Wilton
Buck, O. C.	Hebron	Philbrook, E. E.	Portland
Cobb, C. E.	Denmark	Phillips, H. P.	Auburn
Conant, W. R.	Buckfield	Pierce, Arthur W.	Woodfords
Damon, J. H., Dr.	Rockland	Reynolds, W. E.	Winthrop
Deming, Wm. L.	Salem, Ohio	Rines, J. Henry.	Portland
Dickey, Miss E. A.	Greene	Robertson, R. E.	Westbrook
Dolloff, E. W.	Standish	Roberts, J. A.	Norway
Dudley, F. H., 71 Davis Ave.,	Auburn	Roberts, W. G.	Alfred
Dunn, Charles, Jr.	South Portland	Rolfe, P. C., 98 State St.	Portland
Elder, George K.	Lewiston	Savage, Will N.	R. F. D., Waterville
French, E. O.	Norway	Shaw, Harold J.	Topsham
Grant, D. B.	Richmond	Smith, W. J.	Hebron
Hamlin, Simon M.	South Portland	Sweetser, H. P.	Cumberland Center
Hibbs, J. A.	Hebron	Thompson, Arthur.	Intervale
Hutchinson, E. E.	Hebron	Wyman, F. L.	West Paris

ANNUAL MEETING
OF
MAINE STATE POMOLOGICAL SOCIETY.
PORTLAND, NOVEMBER 14-16, 1916.

TUESDAY EVENING, NOVEMBER 14.

Prayer.

ADDRESS OF WELCOME.

HON WILFORD G. CHAPMAN, Mayor of Portland.

Mr. President and Friends of the Pomological Society:

There hangs across Congress Street, in front of the City Hall where we now are, a banner of the Chamber of Commerce, having upon it the word, Welcome, and the name of your Society. In behalf of the people of Portland, I repeat and emphasize that welcome this year and every year, as often as you care to visit the city.

In ancient times it was customary to celebrate the harvest festival and the vintage festival by appropriate rights and ceremonies. If you should read in history that the people of a certain city, which was the principal city of the state or country in which it was situated, made a festival and invited to it the people from the surrounding country, and that the people who came to visit the city brought with them choice offerings and exhibits of fruits and flowers, which were taken into the beautifully decorated and brilliantly lighted festival hall of the city; and that the town merchants and principal men of the city gave prizes to the people bringing in the fruits and flowers, and decorated them with purple ribbons, inscribed with letters of gold, you would surely say that there must be some reason why these people from outside the city were thus honored and

entertained and decorated by the people of the city. You would probably conclude that it was because the people in the city appreciated the work and skill of the people of the country in raising fine fruits and beautiful flowers which they brought in; you would conclude that the people of the city were supplied with fruit and other produce of the land which was cultivated by the visitors whom they thus honored. And if you should read further, and learn that the land of the state where the fine fruit was raised was the finest fruit-raising land in the world, you would doubtless conclude that the people of the city did wisely in thus encouraging the raising of the fine fruit and other produce of the farm; but if you should read further and find that the people of the city were not supplied with the fruit and produce of the land, raised in their own state, but that the people who raised this produce sent it to far distant cities, like Boston and New York; that the people of the city where the festival was held, bought from a far country known as Oregon, the fruit consumed in the city, you would be much surprised and wonder why they did business in such an expensive manner.

Mr. President, I submit that the fanciful picture that I have drawn shows exactly what is being done in our own city and state at the present time. The time was when the various cities and towns of this state were supplied with the farm products and produce raised upon the neighboring farms, but at the present time it is not so. Fruit and farm produce raised in Maine is shipped to Boston and New York merchants and the Maine merchants are supplied from out of the city and state. Portland merchants, in particular, are very largely supplied from Boston. Somebody pays the extra cost of transportation and it must come out of the farmer in the way of less profit, or out of the consumer in higher cost.

It is the purpose, as I understand it, of the far-sighted business men of Portland and of your Society, to change these unfortunate conditions and to bring about a coöperation between the men of the city who consume and the men of the country who produce—the work of each must be useless without the other. It is wise, therefore, to meet together and discuss these questions. Maine has suffered much in the past from the emigration of its people to other states. The tide is beginning to turn the other way and, during the last census

period, ending in 1910, the population of Maine increased the same per cent as the population of Iowa, namely, six and nine-tenths per cent. To be sure, the increase is largely in the cities, but the country towns are also beginning slowly to increase. With the wise coöperation between the men of the city and the men of the country, Maine is shaping itself for the future, to assert and maintain its appropriate place as leader among the states of the Union.

ADDRESS OF WELCOME.

GEORGE L. CROSMAN, President Chamber of Commerce,
Portland.

The Chamber of Commerce of Portland is glad of the opportunity to extend a most hearty welcome to the Maine Pomological Society. We are glad that you could meet with us again this year. His Honor the Mayor has already anticipated me in some things I had intended to say in discussing the question of coöperation. The Chamber of Commerce believes in the principle of coöperation—in the “get-together” spirit. We believe more success is to be gained by the individual and by the community, through coöperation and fostering our mutual interests, than by unfriendly competition.

I might bring to your attention, as an instance of the coöperative spirit which pervades our people here in Portland, the beautiful electric sign of welcome which has been so generously donated to this occasion and erected by the Cumberland County Power and Light Company in assisting us to extend to you our welcome and greetings. It is true that, by delay caused by the storm, the sign is not in operation tonight, but will be by tomorrow evening. It represents the outlay of at least \$100 in its erection and shows how willing this service corporation is to lend its aid to our public affairs.

The Chamber of Commerce of Portland has for its slogan two ideas—Progress and Coöperation. We are not satisfied with letting “well enough alone.” We believe in steady advance, improving the quality of all our products and attain-

ing to higher ideals with each year of effort and achievement. We join with you in hearty approval of the efforts you are making in this advancement in your line of fruit growing. You are achieving splendid results, and we congratulate you on them.

The Chamber of Commerce of Portland is not confining its thought and effort solely to our own community here in this city. We are interested in the welfare and progress of the whole state. It is our aim and ambition through our connection with the allied Boards of Trade or Chambers of Commerce in our sister cities in the state, to do everything in our power to advance the welfare of the whole state. It is in this spirit that we welcome you tonight.

We believe in holding high our standards of doing business. Integrity should be our watchword all along the line. We should all realize that each man has an influence and in one way or another represents Maine. Let no man say he is without influence. We each have an influence that may be wider than we realize.

When Maine products go out from our state into other states, the name of the individual or the firm who ships them is not so much thought of as the fact that they come from Maine. Therefore, every shipper of products out of the state should realize that he is upholding or throwing down Maine standards and Maine ideals. Maine should everywhere be a synonym for honesty and quality. Every barrel of apples that leaves the state should be exactly as represented. It should not be A-1 on the top and poor on the bottom, but should be uniform in quality right through.

We are glad that this is a fundamental principle for which the Maine Pomological Society is working and hope it will be eminently successful in its efforts in this direction.

It has been intimated here that for some reason home consumption of Maine apples is not as great as it should be. I believe one reason for this is that we do not appreciate what is at hand and near our own door as much as we do those things that come from a distance. For this reason, I believe people in other parts of the country and other parts of the world really appreciate Maine apples more than we do here at home. This is not as it should be. I have seen apples grown in other parts

of the country, but so far as my observation goes, for color and flavor and genuine worth, Maine apples are the real thing, and those grown in other states are not in it with ours. We should appreciate our Maine fruit more than we do.

We wish the Maine Pomological Society every success in its work, in raising standards of fruit growing all along the line; we are not only glad to have you with us this year, but hope you will be with us next year, and in years to come. We assure you that the people of Portland will be more than glad to do everything in our power to welcome you in holding your annual meeting and exhibition here in our beautiful city.

RESPONSE.

H. L. KEYSER, Greene.

This is a very pleasant task that has been assigned to me this evening, to thank the Mayor and President of the Chamber of Commerce for their kind words of welcome.

This society is forty-three years old. It was born in the town of Winthrop, January 14, 1876, and was incorporated by the legislature of that year, with a state stipend of \$500, which was later increased to \$1000, and a few years ago, to \$2000 per annum; and it speaks well for its officers, past and present, that no question has ever been raised as to the judicious expenditure of its income.

We might term ourselves the Progressives of the orchardists, as we believe in modern methods and the application of scientific principles to fruit growing. We work in harmony with the Agricultural Experiment Station and College of Agriculture, and the larger portion of our income is spent along educational lines. We believe in coöperative fruit growers' associations and have always stood for an honest pack. Only yesterday, while passing through a town, I was called in to look at a carload of fruit that was being loaded for shipment. The fruit was marked No. 1 and No. 2 and it really was so unfit that it ought to have been in the unclassified grade, for it was good for nothing but cooking. Two inspectors from the

State Department of Agriculture were in the car, inspecting. I am anxious to see what action the Department will take upon this car. It seems strange, after all these years of education and warning of the injury to Maine fruit that such packs cause, that there are still packers who practice deception instead of honesty as their motto. We are also interested in marketing and trust the time is fast approaching when our state, like New Brunswick, will make an attempt to solve this perplexing question, that the farmer may secure a more equitable proportion of the consumer's dollar.

Again, I thank you, gentlemen, and through you the citizens of Portland, for your hospitality.

GROWING APPLES.

PROFESSOR SAMUEL FRASER, Genesee, N. Y.

(Illustrated Lecture.)

I believe that the first picture I show illustrates one of the points which is fundamental to the fruit-growers of Maine, and that is the mode in which the trees they plant are propagated. In the past, the custom was to top-work a natural tree which was found growing wild, or to move some wild tree into the orchard and top-work it, or even to buy trees and work these over to any desired variety. Years after, the fruit growers determined that they wanted the trunk of the tree to be of the desired variety. But no attention has been paid to the root system. The nurseryman is in the habit of securing his seedlings from France or some other place.

These seedlings have been grown from seed which was collected in various places, frequently in France, and the so-called French crab are seedlings grown from seed gathered out of the cider mills. Should these seedlings be allowed to reproduce fruit, it is found that part of them would produce red apples, others yellow, and still others, green. Some of them are vigorous growers and some are lacking in vigor. Some are more or less subject to fire-blight and canker; others are resistant to these diseases. So that on the whole, the nurseryman plants

a mob of individuals, and upon these, either by grafting or budding, he propagates the desired variety.

In certain sections of Maine, in Minnesota and Wisconsin, the climatic conditions are so severe during the winter that these seedling French crab roots are often winter-killed, while the trunk would winter perfectly satisfactory, so that it has forced Maine fruit growers to realize that the root is a very important part of the tree. We must recognize that the root is certainly half of the tree, and that in many instances the excellent returns secured from individual specimens may be due, in no small measure, to the fact that they are on a root system which is congenial—one which is able to work to feed the tree in a proper manner and work harmoniously with it.

As time goes on we are beginning to recognize that there are individuals in apple trees which can work harmoniously, and those which cannot. It has been our experience that the Wealthy, when top-worked on Rhode Island Greening trunk, does not make a satisfactory union. It does not grow as vigorously as we might expect; while the Greening will grow quite well on a Wealthy trunk. Probably all of you are familiar with the fact that Bartlett and Seckel, while they will grow for a short time on a Keiffer trunk, the union is not long-lived. It is one of the cases when divorce is frequently the only solution, and in the course of a few years the top either dies or blows off. Twenty Ounce makes a much larger tree when topped on Baldwin than when top-worked on Northern Spy. We feel confident that the Tolman Sweet is a much better trunk than the spy for this variety. And probably the same is true for Tompkins King. Both of these varieties are top-worked in many places, owing to the danger from collar rot.

For the more northern sections of the apple-growing belt, it is probably advisable that the trees planted shall be propagated by means of root grafts, and that the grafts shall consist of a very small portion of root and a long graft, and that the latter shall be planted deeply so that it may send out roots of its own, the small piece root merely being utilized to carry the individual until it has established a root system, independently. One of the difficulties with this system is that some varieties, such as Oldenburg, seem to be quite tardy in sending out their roots. But the Tolman Sweet can be propagated fairly well in this

way, also McIntosh, while the Fameuse can be propagated, with a reasonable degree of security, from seedlings. It is one of the few varieties of apples which come relatively true to type, from seed. Australia has gone so far as to stipulate that all apples shall be propagated on Northern Spy roots. Northern Spies are propagated either from cuttings or layers, and then the variety is budded or grafted upon the same. The reason for this is, that they have determined that the Spy is relatively immune to root aphid. This is the only country where the root system has been standardized. I believe that the man who first secures an orchard on standard roots, which will give the maximum of efficiency, is the man who will win in the close fight which is coming; that it will be essential for us to pay attention to this factor in the future, and that it is the logical development to expect. We have passed from the day when we bought an apple tree because it was an apple tree, to the time when we bought a variety which we wanted, so we shall insist on having that variety on a root system which will be most efficient.

As carried on at the present time, the custom is to secure our seedlings, usually from France or the Middle West, although a limited amount is now being grown in New England, and, after thoroughly fitting the land, it is marked so that the rows will stand forty inches apart. An opening is made by the trencher; the seedlings, which have been previously tied up in bunches of fifty, are distributed down the rows, and gangs of men, working in twos, follow, one with a spade opening the trench a little, the one holding the seedlings placing them at the back of the spade so that they are pushed firmly down to the bottom of the trench and are left standing erect. The seedlings are firmed with a firmer which consists of two wheels which press the earth tightly around the trunks, and this may be done a couple of times, after which the rows are cultivated. the soil is pushed around the young plants. If seedlings are planted they are budded the following August; the tops are cut off the next spring and the plant is grown for two years, when it is sold as a two-year bud. In the case of the root grafts, the grafting is done during February, the seedlings being planted the following April or May and dug at the same time as the buds, so that they have been in the ground three growing seasons, when they are known as three-year grafts. They are just the same age as

the two-year-old bud. Sometimes apple trees are sold a year younger than this, either as one-year-old buds or two-year-old grafts. Pears are usually propagated on French pear seedlings; plums on myrobalan stock; cherries on both mazzard and mahaleb stocks, the latter being the one most frequently employed. The former is the only one to use for sweet cherries, and it is our native wild sweet cherry. It is much more difficult to handle in the nursery than the mahaleb, and since the fruit grower does not realize the difference, the nurseryman has employed the mahaleb stock, with the result that there has been a marked mortality among the sweet cherries planted during recent years. The union made by the sweet cherry bud with the mazzard stock is much better than with the mahaleb, and for eastern conditions the mazzard root is the one which should be planted.

Thus far, we have been shipping our trees direct from the nursery and not putting them into storage. When trees are handled freshly dug and are delivered to the planter promptly, we advise that the terminal parts of the limbs be not cut back; we prefer, in the case of apples and pears, that a central leader system be used in the training of the tree and that, if there be eight or ten limbs on the tree when it is received, that these be reduced to four well placed round the trunk, with the greatest possible interval between them. That is, if a space of twelve inches could be left between these branches it is more desirable than six. There is no necessity to cut off the ends of the limbs unless they be dried back. The cutting off of the terminal bud merely retards growth, because this bud will usually start into growth seven to ten days earlier than any other bud on the twig, and the sooner we establish growth in the case of a young tree, the better. In the planting we merely desire to emphasize that it is important that the tree establish itself quickly. In order to do this the soil should be compacted closely round the roots. It is more important to have the ground packed tight than any other thing, because it is not until the soil is in touch with the roots that moisture can flow from the soil into them.

Greening and McIntosh begin to assume their spreading habit of growth at six years after planting, and by the time they are eight or ten, the width is in the proportion of 14 to a height of 10. On the other hand, such varieties as Oldenburg, Wealthy

and Twenty Ounce, are upright in growth. This is also true of Wagener. But from ten years on, owing to the branches being pulled toward the ground by the loads of fruit, the shape is changed markedly and the diameter of the tree more nearly approaches the height. Lack of knowledge in this respect frequently leads planters of young trees to feel that they should cut back their trees because they are afraid they are going into the air too much. We are led to believe that it is a much safer plan to try to encourage early bearing and have the continuous load of fruit upon the tree and cause it to spread, rather than to attempt to cut it down, frequently delaying bearing thereby. It has been our experience that when we give annual prunings, either to apples or pears, as is frequently practiced by old country growers and those brought up in the past, that we merely make a lot of work for ourselves—we stimulate the production of a lot of wood and we delay bearing. So that we have come to practice the more lazy method of practically leaving the tree alone, except to remove, from time to time, a limb which we are sure we do not need. And then, as soon as the tree comes into bearing, practice a certain amount of thinning out of limbs which we know can be spared. In both young trees and older trees we make it a policy to do our heaviest pruning when we are sure the tree is going to bear a crop of fruit the same year. If we give a heavy pruning the year the tree is not going to bear, we are apt to encourage the growth of a mass of suckers. The sucker is a protest that the man abused the tree and was not, so to speak, on the job. By giving the heavy pruning when a heavy crop is assured, we increase the size of the fruit that year, and the energies of the tree are so thoroughly absorbed in maturing the crop that, practically, no suckers are formed, and the tree is much more apt to set another crop of fruit next year and tend toward annual bearing.

We believe that any pruning should be done whenever it is convenient, from, we will say, November until the following May, although, perhaps in Maine, with the more severe winter conditions, it is better if it be delayed until the spring. We believe that the growth made up to the first of June is made from sap which is already stored in the trunk; and that after this date, the growth is busily engaged in preparing for the succeeding year, the fruit buds being formed during July and

August, and the food supply for the coming season being elaborated and stored in the new wood, both fruit and branch, during the balance of the season.

Our practice in spraying has been to give a dormant spray as the leaf buds are opening and until the leaves are probably half an inch in size. We have been using lime-sulphur, 1-10, with arsenate of lead, controlling the blister mite as well as the scale. This is followed by a spraying when the buds show pink, and again after the blossoms fall, and sometimes one more. We have usually practiced cultivation, and in the young orchards, have grown crops for the first three or four years, usually rotating the same. The crops used have been corn, beans, peas, which are mowed and sold to the canning factory green, and every three or four years a crop of clover. The land has been manured whenever we could give it, and we have used fertilizers from time to time to maintain the vigorous growth of the trees. We have under-drained the land whenever we deemed it advisable.

When it comes to harvesting, we have used barrels to the greatest extent, although for the shipment of summer fruit we are using the bushel basket. In the past we used the bushel hamper, but the bushel basket is so much more convenient that it has practically supplanted the hamper. We fill them quite full and use a cushion to insure safe arrival of the fruit. In the past our fruit was all put up over the ordinary running table, or over the cloth table from which it was picked out by hand, but during the past year, owing to the requirements of our law in regard to the sizing of fruit, we have used a grader, and I can confidently assert that the old method is dead. The use of a grader reduces the cost so much that the old hand method is prohibitive; so that out of these requirements which we began to feel were so arduous, we find that much good has come. Graders can be made for \$20, and an efficient hand machinery can be had for \$40 to \$60, so that any individual with two or three cars of apples can own one, and for those with less, we feel that the community packing house is the solution. It is going to lead to the development of much more uniformity in the output of our fruit, and I am confident that the establishment of a packing and grading law is going to work out to be of the greatest possible benefit to both grower and consumer. It standardizes our pack and it will stimulate our business.

WEDNESDAY MORNING.

ADDRESS OF PRESIDENT.

G. A. YEATON, Norway.

Ladies and Gentlemen:

It gives me great pleasure to meet you here this morning, and I want to express my thanks to you and the Portland Chamber of Commerce for making this magnificent display of fruit and flowers possible. Our object in coming together at this time is to emphasize the slogan, "Better Fruit for Maine," and show to the world that we can and do grow apples that, by comparison, rank with the best that are produced in any part of the country.

We have felt in the past, and do now, that our big job is to educate the grower to produce a quality of fruit which will attract the attention of buyers from the markets of the world to our state. This can best be done by having the men who have grown apples under similar conditions and who have worked out the problems, come to us and give their experiences to guide us, and keep us from mistakes and teach us to grow better fruit at less expense. We do not expect these men to lay down any hard and fast rules which we must follow to the letter, but rather to offer suggestions which can be used to our advantage. We realize this year, more than ever before, that the orchards must be sprayed thoroughly if we are to produce fruit worthy to be branded "Maine Apples." We have many fungous and insect pests which can be controlled by systematic spraying, applied at the right time, with sufficient force to drive the spray into every crevice, and cover the foliage and fruit with a protecting film of the spray material.

Fertilizing the orchard is another question which we hope to have discussed fully, as there are many different opinions as to the amount and kind to use, and the time to apply it.

Cultivation to conserve the moisture is of so much importance that I hope we can spend some time in considering it. Also the relative value of the different mulch systems.

Grading and packing are among the things about which the growers seem to be a little in doubt, judging by the numerous letters of inquiry which have come to our office.

MARKETING.

Last, but by far, not least, is the question of marketing the crops which we produce. This, in every branch of business, requires the most careful thought. No matter what the product is, the seller must know when and where to sell in order to get the most out of the goods. Right here comes in coöperation. Never before have we seen it so forcibly illustrated as the present season. The small grower who has only a hundred barrels or such a matter and tries to market them himself has found that he was at the mercy of the buyer (not that the buyer is dishonest, but he is out to make what he can for himself). The prices ranged from \$1.25 to \$2.25 per barrel, according to how many bidders there were for the lot.

In communities where there is a good live Fruit Growers' Association this condition has not existed. They have sold their fruit through the sales manager, and by having a standardized pack, have been able to get the highest market price. In every instance the association pack has sold at a premium above the quotations, both at home and abroad.

Only a few short years ago the first Fruit Growers' Association was started in Maine and, in fact, in New England, by a handful of men who fully believed in coöperation and had courage of their convictions. From this small beginning we have associations in several of the apple growing counties of the state, and the Maine Pomological Society ever stands ready to assist along these lines, believing it to be one of its functions.

In previous years, the question of a pre-cooling plant at Highmoor has been discussed, and it is coming up again for the endorsement of this society, and a request that we use our influence in securing an appropriation sufficient to erect a plant at the Experiment Station farm. With a storage house of this kind, the plant pathologist at the Experiment Station can study the conditions which cause the scalding of the apples while in cold storage, and if there is a remedy, he will be in a position to work it out for the growers.

It may be that some varieties can be kept in an ordinary cellar as well as in cold storage and thus save the expense. These are some of the problems which the Station can work out better than the grower, and through their news letters, give it to the people of the whole state. One of the many things

which the Pomological Society has accomplished the past season is getting an adjustment with the railroads of the state on the transportation of empty apple barrels from the manufacturers to the orchardists. In one instance, where the freight on barrels from loading station to destination was nine cents in 1915, it was four cents in 1916. When the matter was presented to the managers of the railroads they were very willing to meet the request and granted all that was asked. By the use of the question box we hope to have all the questions of orcharding and growing small fruit thoroughly discussed and all are urged to participate in the discussion.

MARKET NEWS SERVICE.

J. C. GILBERT, Assistant in Market Surveys, Office of Markets and Rural Organization, U. S. Department of Agriculture.

Well planned production and careful preparation of perishable farm products is of great importance in successful marketing. The value of these factors, however, is entirely dependent on the choice of a good market. Quality and appearance alone will not sell products. The haphazard choice of markets can only result in loss to the shipper. Consistent efficiency in marketing can be achieved only through the elimination of chance in the choice of markets to as great an extent as possible. This is particularly true of perishables. The finding of a profitable market is the most important part in all distribution.

Ideal conditions would be those in which all parties concerned are familiar with all of the market factors. To supply this would require the getting of information as to the amounts of the various products ready for market in all producing areas; the amounts on the way to market and their destinations from day to day; the existing supply and demand in all markets, together with their normal consuming power; and back of it all, the conditions in the producing areas likely to affect present and subsequent production.

The Office of Markets and Rural Organization of the United States Department of Agriculture was organized and began its investigations in the spring and early summer of 1913. It found that little or no information regarding these market factors was available to most farmers and dealers. Some dealers conducting large businesses, some dealers' organizations and a few producers' associations, were equipped for securing partial information regarding produce in general, or fairly full information as to a few products. These organizations found the possession of such information very profitable. Though it was conceded that information gathered by private organizations was of great benefit to them, the practicability of establishing and operating a market news service for many products for the information of everyone was questioned in many quarters.

The fear was expressed (and still exists in the minds of some) that published information indicating a short supply in a given market and attendant high prices would cause many shippers to send their commodities to that point, thereby causing a glut which would be followed by financial loss and a general loss of confidence in the news service. As far as the work has been carried out this has not proved to be the case. In our early investigations, it was found that, contrary to the general idea, shippers of perishables as a rule did not operate as individuals. The bulk of perishables shipped went either through coöperative producers' organizations, or through local shippers and distributors. The men in charge of these relatively large scale shipments, were fairly familiar with general transportation and distribution methods, and it was felt, could make reasonable use of market information. It was decided, then, to conduct an experimental market news service covering a few perishable products.

The work was begun in April, 1915, with the opening of the strawberry season in southern Louisiana. At this time this section was the only district shipping berries into Northern and Eastern markets, and complications were therefore at a minimum. This first work consisted very largely of keeping the producers informed as to the demand and prices from day to day in the principal markets, and as to the amount of their own berries at certain points and on the way northward. Informa-

tion on shipments was also given to market centers. The results of this work satisfied the growers, and at the close of their season they asked that it be continued. The work was continued during the season in other berry-producing sections, and later in the season in various tomato, cantaloupe, and peach producing areas.

As a result of the successful experiences of last year, it was believed that a general market news service was practicable and early in 1916, arrangements were made for the service to include more than half a dozen crops in addition to those reported on last year. This enlarged service has been in operation since early spring, dealing with crop after crop, as the shipping season was reached in each chief producing center. Onions from Texas were added in April; asparagus was given a limited service; southern watermelons were taken up in early summer; and a partial service was rendered the pear and prune shippers of the Northwest during the height of their shipping season. Other crops which have been included are grapes, peaches, cantaloupes, apples, and white potatoes. We feel that the service as it now stands, although slight modifications at times may be necessary, gives promise of meeting the needs of the future as it grows in breadth and scope.

It is the aim of the market news service to give information of as many factors affecting marketing as practicable, to all persons and organizations interested in the products reported. The machinery of our office for collecting and distributing this information consists of a staff of representatives in the principal producing areas, another staff in the chief market centers, and a central office staff in Washington.

The division superintendents of all the railroads report by telegraph to the Washington office each twenty-four hours, the number of cars billed out in their respective divisions. The field staff in the producing areas advises the Washington office daily by telegraph of the general conditions in the area which they are covering, including the weather, f. o. b. buying, condition of the crop, prices paid, and any other information which they consider pertinent to the deal which they are observing. The staff in the central market districts, of which Boston is a fair representative, report daily to Washington the arrivals, market conditions, weather, wholesale prices, and any

other factors which may influence the sale and distribution of the commodities covered. The Washington office acts as a clearing house for this information, sending it out to all of its representatives, who in turn distribute it in their respective districts, whether this be in the field stations, or in the market centers.

The market centers now covered by representatives of the Office of Markets and Rural Organization, are Boston, New York, Philadelphia, Pittsburg, Cincinnati, Buffalo, Chicago, St. Louis, Kansas City and Minneapolis. In twenty-one other large markets, temporary reporters furnish local market information. Such temporary representatives, however, do not distribute the country-wide market information.

One limitation which it has been found necessary to place on this news service in order to make its operation practicable, is, that it shall deal only with car-lot shipments; thus only areas producing a considerable volume of perishables are considered. This narrows the field down to an extent which permits of efficient treatment and, at the same time, permits the distribution of information regarding all movements of perishables which are likely to affect materially the markets.

Pertinent market information, in order to be of value to those who can rightly use it, must be timely. The office in Washington has its own telegraph rooms and receives its messages through its own operators. The reports from the division superintendents of the railways are filed at midnight and cover the shipments for the preceding twenty-four hours; give the states from which the shipments originate, and their destinations. This information reaches the Washington headquarters shortly after seven o'clock in the morning. The telegrams are all in code, in order to reduce the expense. A group of clerks decode the messages and compile the data which they contain. Usually this work is completed by nine o'clock, and the information is sent out immediately to the market and field agents. When the information is telegraphed to individuals and associations, the recipients pay the telegraphic charges. By the time this shipment information has been sent out, messages begin arriving from the markets, giving the morning quotations and other information. These messages (also in code) are decoded, the information tabulated, and sent

out to the market representatives and field agents of the office. This market information is also telegraphed directly to interested individuals and associations who are willing to pay the toll charges.

The plan of distribution of this information is to make it possible for those who desire it to receive it while it is fresh. Each market representative and field agent is provided with facilities for rapidly mimeographing large numbers of these telegraphic reports. The Boston office, which is established to serve all of New England, sends out daily several thousand mimeographed copies of its reports. Copies are made available, both at Washington and in the various cities and field stations to press associations, local papers, and other agencies which can give them as wide publicity as possible. Among those who receive these notices are producers, producers' associations, buyers, wholesalers, jobbers, retailers, transportation agents, and agricultural agents of railroads. They are also supplied to agricultural colleges and schools. In addition, copies are placed on bulletin boards in convenient places in market centers and producing areas.

All field agents receive duplicates of the telegrams sent to Washington by the railroad superintendents, whose divisions cover their field districts. They are, therefore, informed as to local shipments each day, before they begin to receive the telegrams from Washington. Whatever information these field agents can secure from shippers and others regarding diversions and other questions that will be of interest and value in their particular districts, is added to the general market information received from Washington. In many instances this information has led to changes in shipments which have avoided gluts and kept the various markets well supplied.

In general, the results of this market news service have been very satisfactory. Producers and producers' associations no longer need to guess at conditions or maintain at a great expense private agents who can do no more than give the same or part of the same information which is being published by the Office of Markets and Rural Organization. If conditions in the market change while the commodity is en route, the shipper usually may be informed of the change through this service in time to divert his car to a market which the same report shows

to be more favorable. Producers who sell to buyers at the shipping point can be accurately informed of market quotations, and, if reasonable prices are not offered, often may make shipping arrangements. Dealers through the same service may keep informed as to supplies moving out of the producing sections, and may take steps to see that their supply is kept at the proper ratio to the amount shipped. Knowing the arrivals at other markets, they may assist in maintaining normal conditions by finding outlets for their surpluses or sources of supply in case of shortage.

The effect of the market news service in general, on all phases of marketing, according to the reports from producers, transportation agencies, and dealers, has been the creation of a tendency toward a greater stabilization in the marketing of perishable fruits and vegetables.

QUESTION BOX.

PRES. YEATON: When should old wood be cut out?

MR. FRASER: Just what is the meaning of old wood?

PRES. YEATON: Wood that has died either from old age or disease, or from an injury, or for any reason.

MR. FRASER: I would cut it out just as soon as I could—any time that there is a free time. Of course, if we have a lot of wet weather in April we will prune then. We plan to prune when we cannot do anything else. We may prune in the winter time to some extent, and we may prune as late as in May, and any dead wood we cut out any time. But, as I mentioned before, with bearing trees we try to make the cutting of live wood only when we have quite a full crop. We try not to prune a tree when it is not promising to bear fruit that year, that is, to do more than cut out the dead wood.

PRES. YEATON: Now what effect does the dead wood have, leaving the wood in the tree, on the vitality of the tree?

MR. FRASER: I really cannot answer that, just how much effect it has, but I would like to have it taken out just as soon as I could. I do not know whether the tree itself has cut that wood off fairly safely from its anatomy; although, if you leave it there, of course rots may get in and penetrate the trunk. Therefore, I say I would rather have it cut off to

sound wood, so the healing can go on. All of these things are business propositions and frequently a man has to do his pruning when the time is convenient, and so with us, we generally come down to a time when it is economical to prune because other work is not pressing. Really, that seems to be a bigger factor in deciding when we prune than anything else—whether it is feasible to get at the work.

PRES. YEATON: Now, another question that was handed in early this morning is No. 3 on the question list: Is there any successful treatment known as yet for the Baldwin spot? I will ask Dr. Morse to answer it.

DR. MORSE: Not that I know of, personally.

PRES. YEATON: What has been tried as a remedy for that, that you know of?

DR. MORSE: Professor Fraser can perhaps answer that better than I. We have had a vague notion that the development of Baldwin spot has something to do with the nutrition of the tree. This is very vague, for no one seems to be able to tell exactly what conditions need correcting. It has also been claimed that storage conditions are partly responsible for its development on the fruit.

Certain evidence was brought out by Professor Brooks in New Hampshire, which showed that there, at least, another apple fruit spot has been mistaken for Baldwin spot. This trouble I am inclined to think, from what I have learned by observation and from talking with others, particularly at this meeting, has been rather common in Maine during the past season and may have been confused with the true Baldwin spot. This other fruit spot is caused by a fungus which it was shown in New Hampshire could be controlled by spraying. Brooks maintains that it is due to the confusion of the two troubles which led to the earlier reports of controlling Baldwin spot by spraying.

Some experiences which have been related to me here at this meeting indicate that in some instances the spot which has been troublesome this season has been controlled by spraying. Wilson Conant has, I think, mentioned some such cases as coming under his observation, and Mr. Robinson has also reported similar observations to me. Therefore, I am inclined to think that in many cases it is the other fruit spot, the fun-

gous fruit spot which has been troublesome this year. I do not personally know of a method of controlling true Baldwin spot.

PRES. YEATON: In your opinion, Doctor, what has caused those red spots on the apples this year where there is no indication of Baldwin spot or a fungous condition, where it is merely in the skin and had not penetrated into the pulp?

DR. MORSE: Why, from my standpoint I feel positive that this is not due to a fungous parasite. Dr. Patch and I have taken up the matter and discussed it between ourselves, and she inclined to think that this resulted from some insect attack when the apples were smaller. She has also stated to me that she has seen a number of apples spotted in this manner, where it was plainly due to heavy infestations of oyster shell scale on the fruit, but where the insects had disappeared from the surface before the fruit came under observation. In some cases which she and I examined, there is considerable reason to think it may be the apple seed chalcid. We find oftentimes in those apples that the seeds are abortive. I have no doubt that Professor Fraser knows more about the work of that insect than I do, for I have never seen it before.

QUESTION: May I ask Mr. Gilbert whether they propose to publish any data as to what is the optimum and maximum supply to feed to any special market? Are you tabulating it with that idea?

MR. GILBERT: Not exactly. We hope, after we have these investigations in which we tabulate every day the supply which arrives in the market during the principal part of the shipping season, to tabulate some features which will have a bearing at least toward the discovery of what the market can actually consume. But you must realize that there are many factors which enter into consumption figures. There are times when a slight turn in the weather will cut down the buying of any commodity from 50 per cent to 75 per cent. The arrival of another crop of fruit, on the market, although the crop in question may be of good quality and a sufficient supply, may cut down the consumption of that first variety very largely. There are so many factors which influence that, and they change from year to year so greatly that it is going to be difficult to put out any figures to show exactly how many bar-

rels of apples Boston can consume. That can be arrived at approximately, only. We hope to give as much attention to that part of the work as is possible.

Mr. FRASER: Just the same, would it not be a mighty good thing if you would get together that data as to what does affect conditions in marketing, so that we would realize how dependent we are on fruit growers of the banana and the citrus and other fruits?

Mr. GILBERT: I have not the least doubt but that it would be valuable information, and we shall get to that just as fast as we can. But, as I said a moment ago, we are still in our baby clothes and how fast we grow out of them depends on a great many things. We are handicapped for lack of men who understand investigational methods as well as actual market conditions—men who have the training and know how to investigate things and yet are pretty good judges of markets. We must have a man who has had the educational advantages of our colleges, and at the same time has had practical experience on the markets or in the produce sections, and those men are scarce. We are having a great deal of difficulty in getting the right kind of men to build up our machinery. And then, too, we have to depend of course upon the amount of money which is furnished by Congress and sometimes we get more than at other times. But I have not the least doubt that, as this work progresses, we will be enabled to take up more and more of these vital and pertinent questions, and just as fast as this information can be gotten hold of and put in usable form, I assure you that you will be furnished with the information.

Mr. SANDERS: I think it might be of interest, and probably of value, to indicate who may receive these reports. I think you did not cover that point.

Mr. GILBERT: Any individual grower can receive any of these reports. All we require is that he make a personal application for them. I have on my list in the Boston office now, names of a great many apple growers throughout New England. I have a map in which I put tacks representing the distribution of our reports. I have not the names of all the apple people, but those that I have show it is pretty widely distributed. Any of you who can make use of this information

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can have it, and you may spread that information just as widely as possible. If he wants it faster than we can get it to him my mail, we will send it by telegraph if he cares to pay for the toll charges.

WEDNESDAY AFTERNOON.

PLACE OF THE APPLE IN THE DIET.

PROFESSOR F. R. FREEMAN, Orono.

I am not going to give an address; I am going to give an informal talk on fruits and some of the reasons why we should have fruits more in our diet. I think that people often consider fruits more or less as an accessory—something that should be eaten and should be served for the sake of flavor, rather than as a staple food. The census report for 1909 gives us a little idea of the extent to which fruits are grown and cultivated in this country, and gives us some idea of the comparative values of these various crops. This report gives the small fruits valued at practically \$30,000,000, grapes at \$22,000,000 and citrus fruits at \$22,000,000—\$74,000,000; the tropical fruits at \$2,000,000 and the orchard fruits at \$140,000,000. The orchard fruits, therefore, are cultivated and grown to a much greater extent than any of the others. The report says that, of the \$140,000,000 of orchard fruits, three-fifths of that sum is made up of the apple crop, which shows that the apple crop is the most important fruit crop that we have in this country.

Now, what is the composition of the apple, and why should we use it in the diet? We have very little fat in the apple and very little protein, but we have sugar, which is a carbohydrate, present in about ten per cent; to be exact, ten and eight-tenths per cent is the government analysis given for the apple as purchased. Mineral matter is present to the amount of three-tenths of one per cent, and the remainder is made up of water, so that we have a large percentage of water in the apple, and on the face of the fact, it looks as if the apple had a small food value.

In order to get clearly in mind what the uses of the apple are in the body, we should consider for a few moments, perhaps,

the uses of food in the body and what constitutes a good food. We have an old definition which says that food is anything which will build up body tissue as supply energy. Now we know that that is not inclusive enough today. It is true that the foods must build body tissue and that these foods must supply us with the energy to do work. We might liken our bodies to an engine, if we will, that we put coal on; as we put fuel into this engine in order to give it power to do work, so we must put fuel into our bodies in order to give them the power to do work. We know that we need material to build up tissues in the growth of the human being as well as in the growth of plants or in the growth of animals, and that we need to supply a comparatively constant amount for tissue repair during normal daily life. But we have a third function which foods must do besides building body tissues and yielding energy, and that function is the regulation of body processes. It has only been within the last few years that we have paid much attention to this phase of the food problem, and it is in this respect that the apple is perhaps more important than for any other reason.

The sugars and the starches are good energy producers in the body, and we said that we had ten and eight-tenths per cent of sugar in the apple. So that the apple will yield energy in the body. It will help in supplying the power to do work, and in building tissue, because we have the mineral matter present in the body. Mineral matter is one of the important tissue builders because it must be present in all of the tissues and cells of the body. We often think we have mineral matter simply in the bones and in the structural tissues of the body; but we have it present in every cell of the body—in the muscle tissue, in the blood, in the nervous tissue, and so on. The mineral matter that we find in the apple is a good source for this tissue building material. But it is most important, I should say, in the case of fruits and vegetables, to consider the third problem of the regulation of body processes. The uses of fresh fruits have greatly increased in the temperate zone within the last few years. We use a great deal more of the fruits in our diet today than we did a number of years ago.

Now, there is a physiological justification we might say for this increased use of fruits. We have a tendency in our diet to use more and more of the ready prepared and concentrated

foods and those which are easily digested, and exclude the indigestible food residues in the preparation of our foods. A good illustration of this is the use of the ready-prepared, ready-to-eat cereals. In the preparation of these cereals the outer covering of the grain is removed, and when that is removed they remove a great deal of the woody material in the cereal and a considerable portion of the mineral matter. We do not use as much of the whole grains and the whole cereals as we did; we are using milled products. We are using more and more of the finer vegetables rather than the coarser vegetables. We are rather fastidious in our diet and the kinds of food that we like to serve on our tables, and so we are trying to get the things that have a finer taste, a little finer flavor, that are a little more expensive, and as we are increasing the use of these types of vegetables and cereals, we are also increasing the uses of meats in the diet. We do not have any great amount of indigestible material in the meats.

What we need in our food, in our diet, is a certain amount of ballast. The men talk about roughage in food for stock; they discuss the balanced ration for stock, that they must have so much of this food and so much of that, and then they must have so much roughage. We, in our discussion of what we might term balanced meals for human beings, discuss how much of the tissue building materials we need in our food and how much of the energy producers. In supplying those tissue builders and energy producers we must also supply a sufficient amount of ballast in order that the body may carry on its processes in a normal and healthful way. This is one of the strong arguments in favor of the use of fresh vegetables and fresh fruits. We find the structure of the vegetable food and the fruits very much alike, in that the cells are made up of a more or less woody material which we term cellulose. It is this cellulose which will supply the ballast in our diet, and in order that the intestines may carry on their peristaltic movements, we need this ballast which we are going to get from fruits and from vegetables. You have all heard the old saying that "an apple a day keeps the doctor away," and this in part explains that saying. The amount of water that is present in the apple as we have said, is large, over 85 per cent, and this also aids in the peristaltic movement in the intestine; and with the cellulose and with the

organic acids which we find in the apple, helps to prevent constipation. I have said that the minerals will build tissue. Now they not only build tissue, but they help to regulate all of the body functions. We need iron, for instance, in the blood, in order that the oxygen may be carried to the different cells of the body and that the carbon dioxide may be removed. We need certain calcium salts in order that the heart may be controlled and carry on its work normally. And so we might go on, enumerating a large number of similar uses to which the mineral salts are put in the body. They not only must be present in every cell, but we must have certain ones present in our diet in order that these regulatory functions may be carried on, and the fruits are a good source for these mineral salts.

In the selection and the types of food which we are going to have in our diet we must have a balance in mineral matter. If we eat large amounts of meat, and if, from the meats and from the animal foods we derive a certain class of minerals and of mineral salts which are acid, then we must have a balance between these acid salts and the alkaline salts. We want these salts to neutralize each other, and so we need to neutralize the acid salts which we derive from the meats and milk and eggs—we want to eat fruit and vegetables which will supply those salts to make a balance in the body. The apple is a good source for this. We have calcium, potassium, and phosphorus in the apple, and these are some of the most important minerals which we have to consider in our diet. We do not want a lop-sided diet for a number of reasons. One reason is, that we may have a balance between these mineral salts. We do not want a diet that runs all to meat, milk and eggs, without fruit and vegetables. We want a well-balanced diet, in regard not only to protein content and the tissue building foods, but in regard to the mineral foods. We have come to find out that a food may contain all of the foodstuff and the constituents which we need in order to build body tissue and to yield energy; still, they may not be adequate to maintain body growth and keep the body in a normal, healthful condition. We say that a food must contain the proteins, the tissue builders, with water and mineral matter to aid in this building of tissue, and that they must contain the energy producers, the starches and sugars and fats, aided by the proteins.

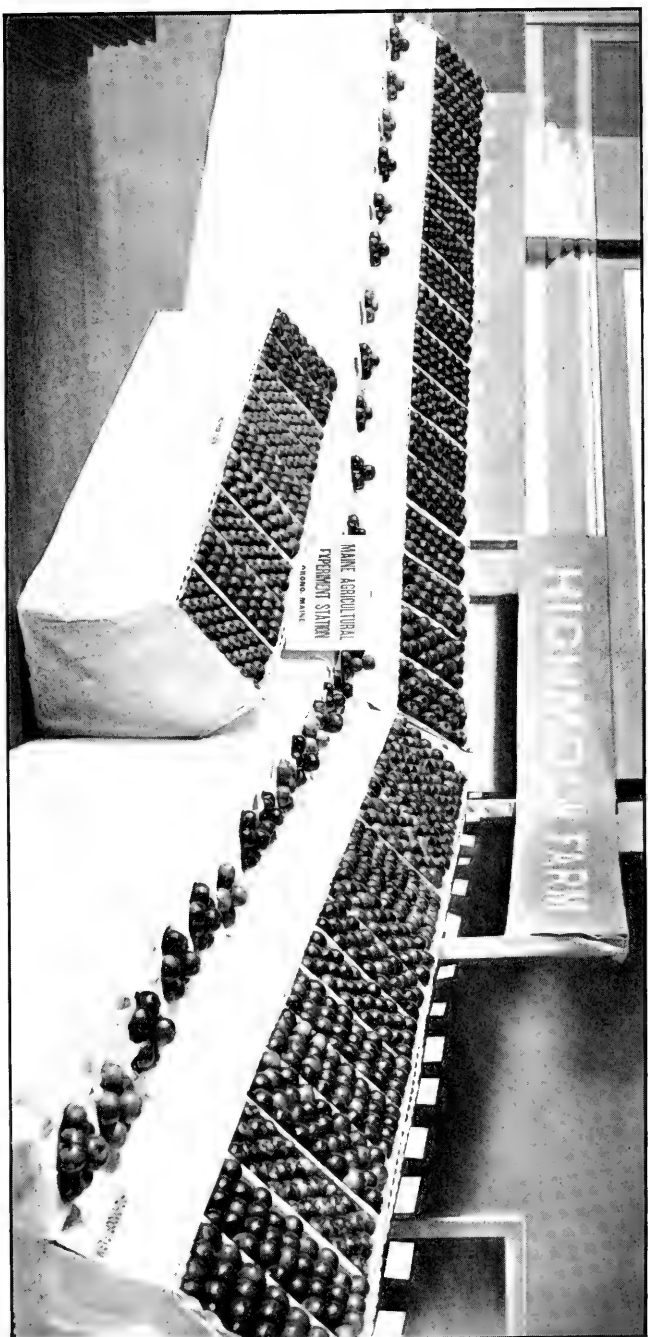


Exhibit in Portland from Highmoor Farm by the Experiment Station, Nov. 14-16, 1916.

But we must have certain other products present, which we have not known very much about, in order that the growth of the body and the body's health may be maintained. We have used a more or less loose term to include this constituent. You perhaps have read in the papers and in the magazines within the last few years something about vitamine. Just what do we mean by vitamine? It was a term used to designate those compounds which we should have in our foods which would best supply the constituents for favoring growth and the normal activities of the body. So a healthful diet, the best diet, must contain these compounds. The one which we are all perhaps more or less familiar with is the anti-scorbutic compounds in food. We have all heard about scurvy and the causes of scurvy, back in the beginning of the polar expeditions, when they used canned goods entirely, dried meats, dried legumes, peas and beans, and the cereals. Now this anti-scorbutic property which must be contained in foods seems to be destroyed more or less by cooking and by drying the foods, so that in the foods which are cooked and in the cereals, and dry peas and beans, we do not have it present in as good a form as we have in the fresh fruits and the fresh vegetables. The apple, along with a large number of other fruits, contains these anti-scorbutic bodies which, if supplied in the diet, will counteract the tendency toward the diseases that are similar to scurvy. These bodies are widely distributed in all of the fruits and fresh vegetables. And so, in a diet where we use fruits and vegetables, we will always have these constituents supplied.

We should remember that we have a great tendency to use large amounts of meat and very little milk. We use richly prepared foods which have a large combination of ingredients that are cooked; we use too much of the highly seasoned and complicated foods in our diet. What we need is more and more of the simple, unprepared foods as they occur in nature—more use of the vegetables and cook and serve them in a simple way. We need to use milk and eggs more than we do, and less of meats, and we need to use fruits more. You will see, then, that the apple has a wide use in the diet; that it not only furnishes material for energy, but it also helps in building body tissue; that it helps to regulate the functions of the body, in the neutralization of acids, for instance, and in the supplying of those mineral

salts which stimulate various body processes, and that it also contains these anti-scorbutic compounds which are much to be desired.

It also adds variety to the diet, which is an important factor, because variety is important. We need to pay attention to variety in the selection of our foods and not run to one type of food or to a repetition of the same kinds of food; because we know that if a meal or a dish is pleasing to the sight and is appetizing, that the food will be more quickly digested and more easily utilized by the body. We want variety and a pleasant flavor, and the apple answers both of these requisites, so, unquestionably, we want to advocate a more liberal use of the apple in our diet. It is a food which we, as people in this state, can procure readily and easily, and it is not an expensive item. We often have false ideas of economy. We have to think about the money that we are going to expend, and we ought to think more about the money that we do expend for food, because we spend more for food than any other one item of expenditure in the household. We might often better economize in the money that we expend for meats and sweets than to economize on the money that we spend for fruits and for vegetables. If we must save money we would better cut down the amount of meat that we serve and the amount of rich desserts and pastries, and substitute plain, simple fruit.

Fruit should be an article of diet in the winter as well as in the summer; we should have means of keeping this fruit so that we can use it through the winter months. Apples, generally, keep fairly well, but a certain proportion will not keep when stored during the winter in the cellar. How are we going to utilize this product which is not going to keep? There is a great deal of waste in the apples in this state as well as in others. Canning is one of the best and one of the simplest means of preserving this food for winter use. We have a number of reasons for canning the fruits and also vegetables, but we should can them first to increase the consumption of the foods which supply the minerals and the acids which I have been talking about; and we should can them in order that we may lend variety to this monotonous winter diet which a great many of us have when we cannot get the fruits out of the orchard and the vegetables out of the garden. And then we should can our fruits in

order to supply the sugar in the winter diet which will give us energy, and also to prevent the waste in the season's fruit. And that is not of the least importance, though it happens at the end of this list. We have heard a great deal about the era of the high cost of living. I wonder if it is so much the high cost of living in every case, or whether the question of the cost of high living has not something to do with it. We are becoming fastidious in this country about the kinds of food that we like and what are necessary for us to have. We need to consider and train people in the utilization of the products which they have at hand and of the conservation of these products. We talk about conservation of force and so on; some of us need to talk about the conservation of food in our own homes—how we can better utilize the things that we have at hand and prepare them in an acceptable way. I think that, if we study the problems of preparing apples, we can do a great deal in adding variety and nutritive materials to the diet.

If any of you are interested in the methods of canning, there are canning sheets available here which are put out by the United States government, and these give full directions for canning apples, fruits and vegetables.

And then we need to utilize the by-products of our apple crop; there are several ways of doing this. We all know about drying apples; the dried apple is very nutritious. All the change that takes place is simply the removal of the water which is replaced in its preparation; we will have the cellulose present, the acids, minerals and sugar, just as we had it in the fresh apple. The United States government is interested in a project for the preparation of apple syrup from the culls and second and third grade apples. They are sending out circulars over the country to interest people in using apple syrup in preference to a number of other types of syrup—corn syrup and maple syrup. They say that a product can be put out which, by following their directions, is just as acceptable as a number of other commercial products.

I think, for the wholesaler who is going to can apples, that the jelly making is an economical problem; that you can utilize the parings from the apples in the preparation of the jelly. We have no fruit which is better for the making of jelly than the apple. We have a good flavor in the apple, a sufficient amount of acid

to make a good jelly, and we have the substance called pectin, which causes the fruit juice to jell. We should can apples in order to utilize the products which would otherwise be wasted. We can peaches and pears. We pay a large sum of money for the fruits which are canned in the western states; and we might well utilize our own products here in this state by canning them and using them in place of the others.

In conclusion, the apple is a staple article of diet. It should be so considered. It should not be utilized simply for flavor and variety, but it has a true food value in that it supplies the sugar which is an energy producer, that it supplies the minerals and the acids which regulate body processes, together with the cellulose, and it is an economical food.

PROPOSED PLANS FOR ESTIMATING THE APPLE CROP.

V. A. SANDERS, Field Agent, Bureau of Crop Estimates, U. S. Department of Agriculture.

The conditions and methods are much the same for estimating all crops, hence, I shall describe briefly the whole service, then speak of the apple crop in particular.

Dealers see the need of reliable information on crops and have developed private crop reporting services. Sometimes such reports are given out to producers. They need such information just as much as do the dealers, if they are to obtain for their crops a fair price.

The crop reporting service was one of the first lines of work undertaken in the interest of agriculture. Its purpose is to give to all alike—producers, dealers and consumers—the most reliable information available.

The Bureau of Crop Estimates furnishes the agency for gathering, compiling and disseminating the information. Growers, and handlers of the crops, are those who have the necessary information. They must coöperate generously with the service in furnishing reports. In return, they receive reports for the entire country. At present, some 150,000 persons are thus co-

operating. They are divided into regular and special lists of reporters. The former report monthly on general field crops; the latter report on special commercial crops, for example, Maine potatoes, or apples.

Estimates on any subject are used to give a quick approximation to something very extensive. Crop estimates must be made quickly, because their chief usefulness results from their being timely. Reports are made to the Bureau as of the first of each month and the Bureau's estimates are released usually about the eighth. The estimates cover some 60 crops and the farm animals, and prices received by farmers.

County, township and special lists of reporters are maintained by the bureau. Crop specialists are employed for cotton, rice and tobacco. It is hoped that two fruit specialists may soon be employed for the fruit crops.

Field agents, one in each of the main states, or in a group of smaller states, are employed to travel and see the crops and men who know them best. Reports by mail are made to them. They study and try out methods for getting more adequate and more reliable data.

For important commercial crops large numbers of growers report their acreage and yields and averages are figured from these returns. About 2,500 potato growers reported in Maine this year. In Aroostook county, twenty-five per cent of all growers reported. Thus a very close estimate on acreage and yield can be made. The degree of accuracy obtained is interesting. Final 1915 estimates were made by the Bureau, as below: Cotton, the estimate came within one-half of one per cent of what the crop ginned out. Rice, the estimate came within one per cent of total reported by rice mills. Tobacco, the estimate came within about three per cent of total reported to the treasury.

Similar measurements for the other crops are lacking; but shipment reports are being used as a check. Railroads quite generally coöperate and their assistance is most helpful.

Farmers should use the reports more fully. See how any given crop is in your own state and in competing states. Find out all you can about general market conditions and see the quantity and quality of competing crops. Then you are in much better position to decide whether to sell your crop now, and at

what price, or to hold it a while. Give the reports more study and make greater use of them.

Apples are hard to estimate satisfactorily; grown over great areas; under every irregularity and subject to so many pests and variable bearing habits. Careful study is being made of this crop by the field agent. An orchard survey is planned for Maine, to be made this winter. It will be a practical inventory of the apple industry. When completed, it will be used as the basis for organizing a special staff of apple growers and dealers who will make the reports on this crop. Besides these growers and dealers, other persons such as the county agricultural agents, certain railroad officials who give attention to the crops are consulted.

It is hoped that fruit growers will more generally coöperate with us in extending and improving the service for their crops. You will have an opportunity to assist in the orchard survey and in reporting the apple crop. Seventy-five per cent of our regular reporters make replies each month; but thus far, only thirty-three per cent of the fruit growers have replied. Now that you see the need for and value of the reports, I earnestly urge you to give us more generous and prompt assistance. When you receive an inquiry, do not put it aside indefinitely, but give careful thought for a day or two, then fill out as well as you can and mail it promptly.

Question: Cannot we use the word crop or full crop in place of this normal crop, as a standard?

Mr. FRASER: What would you call the full crop on an acre here in New England—how much per tree or per acre?

Mr. SANDERS: We never have figured it quantitatively, that is, we have not tried to work out what would be a normal or full crop per tree.

Question: A tree thirty-five to fifty years old, three barrels to the tree is a good crop.

Mr. SANDERS: Well, that sort of a standard has been suggested, but we never have thought we had sufficient reason to specify any particular quantity of fruit per tree as a good crop. There are certain difficulties involved that make that sort of a standard impracticable. Mr. Yeaton, let us have your judgment.

Mr. YEATON: Well, it seems to me that a full crop would be what the average farmer's trees had produced in the average

production per year for a series of years. For instance, if the trees are set thirty-five feet apart, or two rods apart is about what we set them, he would get forty trees to the acre. If he has been gathering one hundred and twenty barrels from that acre, he would naturally infer that his trees were producing three barrels to the tree; any falling short of that he would realize that he was getting less than the normal; if it went beyond that, he would feel that he was getting above the normal. Whether we can educate the people so that they will be able to estimate in quantitative terms, I do not know. Sometimes I have thought that would be a better way. At other times, I have felt that it would be almost an absolute impossibility to get people to figure their apples in terms of barrels or bushels. They simply go out and look and they say that there were more apples last year than this. I have sometimes thought the way we could get at it would be to compare each year's crop—this year's crop with the past. I do not know whether that will work out. I have put in quite a good bit of thought along those lines. and I am just as far from arriving at a definite conclusion now as when I first began to think it over.

Mr. SANDERS: The question of methods that might be successful with regard to the apple crop is a very old one. The Bureau has been wrestling with this problem for years and years and have tried out most every method that has been proposed; they have found out by these years of experience that some sort of a full crop, or a crop, is the most practicable standard to have in mind; that is, it comes nearest in the course of years to getting the information that they need. Now it was suggested at the conference that was held here last year, and urged by some, that last year's crop might be taken as the standard. Well, that has been tested out by the Bureau, and I tested it out myself this year, and was amazed at the sort of returns that came in, asking men to compare the crop this year with last year. In cases where I knew absolutely that there was fully three times the crop of last year, practically nobody got even double last year. So that a percentage basis, using last year's crop as a standard, presents serious difficulties, because few people can get very far away from this idea of a safe normal. Are there any other discussions on this point? Mr. Conant, what do you say about it?

Mr. CONANT: I will say, as our president has already said, that I have given this matter a great deal of thought; have sat up nights and discussed it; it is somewhat difficult, I believe, to get the growers together on any definite method of collecting data along this line in orcharding. Orchardists do not set the same number of trees to the acre, or give them the same care, and I question, after giving it a whole lot of study, whether we can ever hope, by using the crop, calling it a crop, or comparing it with last year's yield, to improve on the percentage basis as now used by the crop estimating Bureau. Personally, having reported to the secretary for the Bureau, and having gotten accustomed to figuring it on the percentage basis of the normal, it is comparatively easy for me to get somewhere near a yield. And when you realize that there is such a great variation in the judgment of men in estimating their own crops, it is really discouraging to get them together. I would like to have Mr. Sanders give the result of an experiment (perhaps you can call it an experiment) last year, with a certain number of growers, in estimating their own crop.

Mr. SANDERS: Last year I sent out to thirty-seven apple growers, some of them here in Maine, others in New Hampshire, Vermont and Massachusetts, an inquiry asking their estimate on their own crop, in barrels. That was to be made the first of September. Then, at the close of the harvest season, these same thirty-seven men reported the yields that they actually had and the total number of barrels estimated came within three per cent of the total number of barrels that those thirty-seven men harvested. That is, the total harvest varied less than three per cent from the total estimated number. But on the other hand, the individual estimates dwindled down to mere wild guesses. I remembered the extreme was near two hundred and sixty per cent away from the facts. One man missed his crop by that margin. But last year was an extremely difficult year to guess at in any way. In Oxford county the crop was all but a failure, and I am not sure but that this wild guess came from up there where the man had practically no crop at all. There were five per cent of these thirty-seven men who came within five per cent of estimating the crop even back two months before harvest, and about five per cent more came within ten per cent and five per cent more within twenty per cent. Then they

ranged from twenty per cent to nearly 300 per cent away from the facts. But it seemed to indicate to me that if we had a large number of such reports, estimates of individual crops, especially after the men had had a series of years of experiments, that we might use these estimates of individual crops as the basis, and then figure the percentage of increase or decrease, if we could ever get the measure of last year's crop, and figure the crop in that way. Perhaps it might be helpful for me to tell you how some of the other crops are estimated. The cranberry crop is one of the nicest little crops to estimate, because it is grown in a very limited area and the whole crop is moved by one railroad, and practically the entire crop is moved. Very few of the berries are eaten down there on the Cape, so that at the close of each marketing period we get an exact measure of the crop. Then, having that measure of the crop, we simply ask a large number of the cranberry men to report the number of bushels they had last year and to estimate the very best they can the number they are going to have this year; that gives the percentage of increase or decrease from last year. That is the method of estimating the cranberry crop. Some of those men growing cranberries longest miss their yields by a wide margin, but it averages up well. A plan that it has seemed to me might work is along this same line, that is, to ask a sufficient number of the best informed apple growers in each county to estimate their own crop, and then from the average of those returns, to figure the percentage of increase or decrease. Of course, in that case, it would be necessary, first of all, to get a measure of some particular crop so that you would have a basis from which to start. However, it seems feasible to get that here in your territory, at any rate, because I believe it will be possible to get the railroads to give us the shipment figures, and perhaps it may be possible to get hold of the figures for the parts of the crops that do not move over the railroads. Here in Maine a large part of the crop does move over the railroads, and the figures have been obtained there for several years. I do not know whether they have in the last year or two; in fact, I believe not. I have not had time to take up that question with the railroads, but I am assured by the Maine Central that they will help us out in any way. I would like to have the judgment of one or two of the apple men on that plan. Do you think it would work success-

fully?—that is, to ask a sufficient number in each county to make estimates of your crops, and then use that as the basis for computing the percentage of increase or decrease from last year, and along with that, ask you to give your judgment on the crop in your immediate neighborhood or locality, perhaps half a dozen orchards, or at most, not more than a dozen that you have seen and know about pretty well, and in comparison with what you consider a crop or a full crop for that locality. One would be a check on the other, you see. Now, Mr. Keyser, I wish you would tell us what you think about this method. Do you think that would be feasible? Could you take that into your orchard and into your neighborhood and use it?

Mr. KEYSER: Yes, I do not know how that would work out.

Mr. SANDERS: First, an inquiry asking you to make an estimate in barrels of your own crop, and then give your judgment in percentage of your immediate neighborhood, perhaps half a dozen orchards.

Mr. KEYSER: I think that is feasible. I think that would work out. We have been doing it on our own.

Mr. SANDERS: Having those two forms of questions, you would have a check, one against the other.

Mr. KEYSER: In most years. Of course there would be an exception now and then.

Mr. SANDERS: How near did you come on your own crop this year?

Mr. KEYSER: Between eight and nine per cent short, over-estimated that much.

Mr. SANDERS: In barrels, how much would that be?

Mr. KEYSER: Roughly speaking, we estimated about 1200 and we packed short of 1100, but we threw out a lot of scabby Greenings. That is, as I said, where your exception is coming in. You can get at it somewhere near. That is all you expect, any way.

Mr. SANDERS: The experience of these thirty-seven men seemed to indicate that the average would come pretty close to the facts. That is, the total number of barrels estimated by these thirty-seven men came within three per cent of the total barrels that they actually packed, and that is a very satisfactory figure. If you can get within five per cent of a crop, like apples, you ought to feel happy. Mr. Sweetser, have you a word for us about that?

Mr. SWEETSER: Perhaps I lost the drift of your discussion here for the time being. But it appeals to me in regard to this whole proposition, that it is pretty difficult for any group of individuals growing fruit to give a very accurate figure. It seems to me that it would be policy—perhaps the time is not ripe yet—but it appeals to me that some time it would be policy to have a man trained for this estimating work, who would put in all his time travelling around and inspecting orchards. I know, in my own case, when I have been asked to give an estimate of a condition, it is possible that I have not seen any orchard except my own, and judging from that one orchard, I give an estimate of conditions for the county. Of course that is only one of the several which are to be averaged. And the same with other crops—sending in an estimate which is nothing more than a crude estimate at the best. Now, another point perhaps is this, that a great many men, no matter how long their training in that particular line of work, no matter how many crops they may have raised, they are unable to estimate very close. I do not believe that I could estimate very close on a crop from one year to another, but I think a man might be trained to do that, or at least you might be able to select a man. Your figures show that there is only one, perhaps, of that group of men estimating for you, whose estimate has been pretty close to actual conditions for a series of years. Now, if you could find such a man as that, whose judgment is so good that he can give that estimate, it seems to me that would be the ideal condition. I think, before we arrive at that time, we should work along different lines until we can do something of that sort. It seems to me that estimating the present crop with last year's crop is much more feasible than estimating with a percentage of a normal or full crop.

Mr. SANDERS: Well, I think Mr. Sweetser is exactly right in speaking of the difficulty that even he has in sizing up his own orchard. The plan that I mentioned contemplates necessarily having as reporters the men who, by long years of experience in judging their own crop, have acquired skill to estimate it closely. I have found, in making inquiries among the successful fruit men in New England, that there are men among them who come very close to estimating their own crop; that is, barring some unusual and extreme weather condition

that knocks the whole business out of line. If you have a hail storm, or severe wind that blows off half your apples, why, your estimate is going to miss the mark. But you have to bar conditions of that kind. The plan would necessarily contemplate having the reports or estimates made by such experienced men as that, and they have to be chosen by personal inquiry. That is the only way you can find out. This orchard survey that I have mentioned will furnish us the necessary information to find those men. Now one other thing that I would like to have your judgment on, in this connection, is the number of reports that would be needed, in a county like Kennebec. It was suggested to me by one of the dealers who has had a great deal of experience in estimating the apple crop for the International apple people, that perhaps twenty reports for a county, such as Kennebec, would be closely representative. I wonder what you think about that. Mr. Keyser, what is your judgment?

Mr. KEYSER: I am not in Kennebec.

Mr. SANDERS: Well, take Androscoggin.

Mr. KEYSER: Well, Androscoggin is pretty well scattered. That would be plenty, I think.

Mr. SANDERS: You think twenty reports from that county would be representative?

Mr. YEATON: There are twenty-six towns in Kennebec county. Twenty would do very well.

Mr. SANDERS: I think perhaps I have taken already too much of your time. These discussions that you have given—while I presume they have not made very great progress—have been helpful, and I certainly hope that you see some of the difficulties that stand squarely in front of what we are trying to do in regard to this apple crop. Now, Mr. Robinson has a little story that illustrates another difficulty we have and I am going to ask him to tell us about it.

Mr. ROBINSON: In respect to the man who does not send in his report. One day I offered one of my reports that I got from the Government to this farmer orchardist. He said, "Where did you get that?" I said, "I get that every night after supper. The five o'clock mail brings that to the box." "Why," he says, "I don't get that." I said, "Didn't you get a bulletin from the Government asking you to report on the crops

in your particular district?" "Yes." "Have you answered?" "No." "You couldn't expect them to send you one. That is the way they have of getting your name, finding out whether or not you are interested enough to send a report. If you were not interested enough to send that report, they have not sent you one." The Government even sends it free. All you have to do is to put on a few figures and they will send you that report for several months, the doings of the whole apple crop of the United States, free of charge. Only thirty-three per cent of those reports come back.

Mr. SANDERS: And mind you that is from a carefully selected list of apple growers. It is not the general farmer. That illustrates the situation so well that I wanted to call on the gentleman to give it.

Mr. ROBINSON: I know hundreds of your reports come into our neighborhood and I only know two men (myself and one other) who send them back. If they could get sixty-six per cent of the reports instead of thirty-three per cent it would be a good deal more accurate. But then, lots of us do not know anything about estimating. In our neighborhood we figured we had about 700 barrels; we had 2,700 barrels. I ordered 400. All I could get was 350, and I had to drive sixteen miles to get those fifty barrels. The interest on the price of a hundred barrels does not amount to much. You better have them in your barn. Lots of my neighbors can not get a barrel to put their apples in. That is the way we estimate crops. I reported I had twice the crop I had last year. I had nearly four times the crop.

Mr. SANDERS: I think it is only fair to Mr. Robinson to state, as I believe, he is somewhat of an amateur in growing apples and has not had the years of experience that will soon enable him to come far closer to his crop.

Mr. ROBINSON: If anybody asked me how much it would cost to build a railroad from here to Cumberland Mills I could tell them pretty nearly.

Mr. SANDERS: We find that the men who have been growing apples for a period of years and have had to measure the crop closely to avoid heavy over-purchase or under-purchase and consequent loss, have acquired this skill of closely figuring their crop.

Mr. TAYLOR: We have been told by Mr. Sanders that a normal crop was what a tree was capable of producing. Now there is not one tree in fifty in the town of Winthrop that produces thirty-three per cent of what it is capable of producing or what it might produce under conditions favorable, if it were treated right. How are we going to estimate on a neighbor's tree what it might produce if he was doing what he should for it?

Mr. SANDERS: I am glad you mentioned that because it gives me a chance to explain a little. We tried it out last season. It had been proposed to me by different people that it might be possible to define this word "normal" apple crop in such a way that everybody would have a uniform conception of it, and to test that out I tried to write a hard and fast definition of what should be considered a normal crop and had a number of apple men test it out. The results show clearly that a hard and fast defined standard is entirely impracticable, and for that reason that idea has been entirely abandoned. That was carried on largely to show whether such a standard could be used, and the returns that came in showed it was entirely impracticable. I would like to make this announcement to the men who participated in that experiment. Now one final word in regard to this orchard survey which I propose. The plan I have in mind is to ask one or two men in each town or township in the state, where any farming at all is carried on, to make up such a list as I have indicated. Last season, when I sent out this inquiry in the same way to towns or to people in New Hampshire, Vermont and Massachusetts, I got back very satisfactory lists from better than seventy per cent of all the towns in those three states, in response to the first request, and I am sure that the apple growers in Maine will not fall below that. You cannot afford to. It showed the keen interest that there is among the people, generally, in this crop of apples, and I want to ask you, and to urge you, if you receive these requests for the lists for your town, to make them out as fully as you can and help us get this information together. It will enable us when we get this inventory together, to plan some sort of service for getting at your apple crop more satisfactorily. We are doing everything in our power to give you reliable information about your apple crop and the crop

elsewhere, but we must have your coöperation and it ought to be given generously.

Mr. FRASER: I would like to illustrate the point in regard to our estimates. A friend of mine estimated he had 2,000 barrels of apples in August; the dry weather continued and he had 800. He had apples enough, but the weather conditions came in. I thought I had 600. I barreled 220. I had apples enough but they were all below size. This illustrates that even men who have been working on these estimates fail under certain weather conditions.

Mr. MITCHELL: Does the Maine State Society publish an estimate of the apple crop? The New York Society sends out two or three reports during the season, estimating the crop from growers' reports to the secretary. Does the Maine association do that?

Mr. YEATON: It does not.

Mr. SANDERS: None of the New England States do, as far as I know.

Mr. MITCHELL: In the daily market report, issued this year on shipments, there have been quotations of local conditions from Western New York and Virginia. Do you not think it would be good policy to have these reports come from Maine and other places in New England—local conditions? I will illustrate it in this way. We grow, for instance, Ben Davis in the Hudson valley, and Baldwins; in Pennsylvania and Virginia, Ben Davis and York Imperial, which correspond on the New York market and the Philadelphia market with our Ben Davis and our Baldwins. We cannot market our Ben Davis successfully until the Virginia Bens are out of the way; our Baldwins and Ben Davis will not do their best until the Pennsylvania and Virginia Yorks have been put on the market. I know that if buyers are paying \$2.75 for No. 1 Yorks, f. o. b. cars, that I can get from \$2.75 to \$3 for Baldwins in New York State. I know that if buyers in Western New York are paying \$3 for A grade Baldwins there, that eventually, if market conditions continue, I can get \$3 or possibly \$3.25 for Hudson river, because the competition in New York and Virginia is a little bit keener than in the Hudson valley and some other places, and if you watch what the other men are getting in Virginia and Western New York you will usually get as

much as they do. If Virginia Bens are bringing \$3 and \$2.50—say \$2.50, the normal price—if you get \$2.50 for a New York State Ben you are getting a good price. Now I look over that report every morning at exactly eight o'clock. I have had that report ever since the first one came out. I have them all on file. If I have had a shipment on any market, either Chicago or New York or Philadelphia, on any market, when my returns come in I take the commission man's report and I turn back to my file to the Government report for the day that shipment was sold, according to the commission man's return, and I look at the commission man's return for the grades of apples, and the Government report, and I can get a pretty good idea how the commission man treated me on that market on that day. I do not blame the Government, I blame the growers for not getting in on that report and reporting from more sections. In New York State the Association is trying and does put out an estimate every year. I spoke to Mr. Sanders last year about the possibility of the growers' associations coöperating with the Government so that in choosing their reporters they could choose members of the association, because I think we all feel that members of our association can be relied upon to possibly a little greater extent than men we have never met and do not know. I want to know if you think that is possible, if the Government can do it?

Mr. SANDERS: Well, I have approached some of the associations here in New England, about taking up as one of their lines of activity and usefulness this matter of gathering data about the crop, but I did not get a very cordial response. The men said, well, they might do it, but probably they wouldn't and they haven't. Of course, if I get the point of your question, some local information in here about particular localities is certainly helpful. Did I understand you correctly about that?

Mr. MITCHELL: Yes, a buyer came to my place and wanted to buy fruit; he said the price was too high. I said, "All right, when will you be back again?" He said, "I don't know, I am going up to Maine." Well, I had no way of finding out what he would be asked for apples in Maine. If that report had had in it local conditions in Maine, apples \$2 or \$3 a barrel, I would have known whether he would get them cheaper here

or whether I could make him pay my price when he came back. When he came back from Virginia and tried to tell me how cheap apples were, I said, "Here is the report," and he could not say anything. Now, if the Maine quotation had been in there from some of the associations or growers I would have had immediate information. If you growers had had information from the Hudson valley as well as from western New York and Virginia, you would have known, when that buyer came from the Hudson valley, what price we were asking him there, and it would be a coöperative effort between all the growers of the states to keep themselves informed.

Mr. SANDERS: I can readily see the greater usefulness these reports would have in the way you mention. I ought to say I have no connection with the Market News Service here. That is carried on by the office of markets, which is a separate part of the department at Washington; although we coöperate most fully and most heartily, Mr. Gilbert and myself, we have no official connection. I think the reason why they have not done that is because they have not enough funds to extend the work so much, but if there were effective coöperation in the way that you indicate they might be able to extend it that way. I feel, personally, that reliable information about what the crop is in quantity and quality, and then this market information that you have, is extremely important and valuable to you, and you can afford, from the mere standpoint of dollars and cents, to put some intelligent time and thought into it. A great many of the growers I approach say, "This is not worth anything. I can't afford to take my time to help you any." I argue that you can and that you are losing money if you do not.

Mr. YEATON: Are there any others who have a word to say on this crop reporting? We have a few minutes. Mr. Robinson, have you a word?

Mr. ROBINSON: No. It has occurred to me as to the number of apple trees. We are setting out new trees and a good many trees are dying. In the last five years the number of apple trees that have died in this state can be reckoned by the scores of thousands, owing to recent depredations and diseases. An apple tree is an apple tree. That is the size of it. We used to sell cream by measure, you know. A quart of cream was a

quart of cream any way. An apple tree is an apple tree. You understand what I mean. It is a question in my mind just how to get at the accuracy of the amount of apples in this state, whether you have the correct number of trees. You depend upon the ten year census. When that is given, one man will figure up every apple tree that he can possibly think of on his place and put in; another man will make a guess; I question the accuracy of that. I know one man who was a village resident who wanted to take the census, and when he got into the country he went to one farmer. "Now," he said, "you give me your crops, your stock, and all that sort of thing as is required, and I am going to estimate—I don't know much about these things—I am going to estimate the rest of the town by yours." I question the accuracy of the census in many respects; I think that there may be errors in the total amount of apples produced in this state, coming from a lack of knowledge of the number of trees. As the crop is given in the state—not claiming to know very much about it, not nearly so much as some of these apple men—it seems to me that the crop is too large, as given by the department.

Mr. SANDERS: Mr. Robinson has touched upon another fundamental difficulty that stands squarely in the way, and that is, that undoubtedly the estimates that are made are much greater than the commercial crop. There is no doubt about that, because our estimates cover what is known as the agricultural crop, that is, the entire volume of everything that is called apples. Apples, on the other hand, among you fruit men, are thought of as part of the total crop which is sold or handled as eating apples. You never think of culls and cider stock as apples. But our estimates are based upon the whole business and necessarily include all that might be called rubbish. Necessarily they are materially above what the commercial apple crop is, and we recognize that as one of the greatest problems that we have, the complete absence of the necessary basic information. That is, if we knew exactly what the commercial crop here in Maine and in every other state in the country is in any given year, then I think it would be practicable and possible, if the apple men would come forth with generous coöperation and, using this method I have indicated, I believe

that we could estimate very closely the apple crop and divide it into the commercial crop, culls, etc., if it is necessary to cover it.

Mr. FRASER: What percentage of the total is commercial?

Mr. SANDERS: I do not know. It varies largely from year to year. A year like this the percentage is low.

Mr. FRASER: Forty?

Mr. SANDERS: Well, I suppose so—something like that. It is merely a guess on my part. In the case of the cranberry crop, where we have this basic information, getting it from the railroads, using this sort of a method, it is possible to estimate the crop quite satisfactorily, and I believe by and by we will have a method by which we can estimate your apple crop, if we finally succeed in getting this necessary basic information. It is going to take some time to do that piece of work because it is a tremendous task to get it for the whole country. Our estimate of the final production last year was 76.6 million barrels for the whole country; that was for this entire crop. We have to figure that way simply because that is the way the census is taken. I have mentioned these things in detail so you may see some of the difficulties that stand in our way.

Mr. TAYLOR: There is one question I want to ask. What is the advantage in estimating, in this way the census is taken, material that is never sold as commercial apples? What advantage is it to anybody? And isn't it misleading, if you estimate you are going to have 50,000,000 barrels of apples and there are only 25,000,000 of them sold?

Mr. SANDERS: That is a very pertinent question to be brought up. The only reason why we have done that is that it is the only basic information available. We recognize perhaps a little better than you the need for this basic information that I have indicated, but until we can get it we have to go forward the best that we can.

Mr. TAYLOR: The Canadian service estimates, does it not, how these orchards would run—ten per cent A grade?

Mr. SANDERS: Well, I hope that some day our service will be extended to give you that information, too. If any one else has anything on his mind in criticism or suggestion, I would appreciate letting us have it.

Mr. FRASER: I think the sooner we get away from estimating the whole crop, the better. We tell the people 76,000,000 barrels, when, as a matter of fact, so far as I can get it, we had about 15,000,000 barrels of commercial fruit, and I think that is somewhere near the fact. It may be a million barrels out, but what is the use of saying 76 million, when, as a matter of fact, there are about 15 million barrels?

Mr. SANDERS: Well, personally, I heartily agree with you and the time must come when the work will be done in that way. The men who have been struggling with these problems recognize these things fully. And now you who must come together in some sort of a body make your influence and your needs felt down there with the agencies that have these things in charge. That was brought home to you the past year at the conference that was held, and a number of the things that you requested have been accomplished since then.

Mr. TAYLOR: Would it be possible for you, outside of this, to estimate on the commercial apple, or would it have to be incorporated with the other?

Mr. SANDERS: Well, the Bureau does make sort of a stab at this. It makes an inquiry as to what per cent of the total will be of the commercial grades, and then I think they publish some sort of figures on that, but it is not a very satisfactory way of getting at it. The commercial crop ought to be the principal feature of the estimates on apples. That is the way I look at it.

Mr. TAYLOR: You come so near on the potato crop—don't they have small potatoes when they estimate it? How do they do with that?

Mr. SANDERS: That brings up another fundamental fact. You see the apple crop, as I mentioned at the beginning, has so many irregularities and variations different from the other crops. Practically all of the cranberry crop I mentioned, and a very large part of the potato crop, is commercial. But when you come to apples, you see what happens. You have a large margin of the total that is not apples at all, and that presents another difficulty. I think the estimates ought to be made primarily on the commercial crop, and then this other stuff can be handled as a side line in whatever way is needed. But if you people expect to get it done that way, it is up to you to take some action, get yourselves together and make your influence felt. I have done all that I can.

Mr. BROWN: I would like to ask Mr. Sanders a question. This year in my orchard I estimated my crop at so many barrels in August and September—the early part of September, on a commercial basis. After that, a lot of scab appeared on the fruit and it upset all calculations. I figured I was going to get a pretty clean crop and I had to figure later on about sixty per cent of No. 1's and forty per cent of No. 2's. Now, in your crop estimates, when you send in your estimates and something like that occurs, that will knock it all out, won't it, on the commercial estimate?

Mr. SANDERS: Those things are apt to be taken account of in the next report. Apples are peculiarly subject to that variation. Also the weather comes in and knocks the quality right out of them, as it did this season.

As a final word, I certainly appreciate your patience in listening to all of this and hearing this long recital of difficulties and problems. I certainly appreciate your interest and whatever any of you can do in helping get this orchard survey together, and then, whatever you may do after that, is completed in sending in reports. I hope next season to get out and meet a number of you in your orchards and go over some of these things with you personally, and by and by we are going to have this service better. We have made substantial progress in a number of the crops and I believe it is possible, eventually, to work out something that will be satisfactory for apples.

ANNUAL BUSINESS MEETING.

THURSDAY, NOVEMBER 16.

Meeting called to order by President Yeaton.

The following committee on resolutions was appointed by the president: H. P. Sweetser, Cumberland Center; W. C. Robinson, North Anson; D. S. Clement, Winthrop.

T. E. Chase presented the following report as treasurer, and it was voted that it be accepted.

REPORT OF TREASURER.

RECEIPTS.

1916.

Jan. 1, Balance on hand (including \$190 for transfer to permanent fund)	\$951 80
4, Interest on stock	16 00
Interest on bonds	22 50

Mar. 30, State treasurer (1915 stipend)	70 88
July 31, Interest on stock	16 00
Interest on bonds	22 50
State treasurer (1916 stipend)	292 54
Dec. 26, State treasurer	698 84
1917.	
Jan. 3, State treasurer	513 50
Interest on stock	16 00
11, Interest on bonds	22 50
Advertising account	68 00
Annual dues	41 00
Life memberships (for transfer to fund).....	40 00
22, G. R. Cooper & Company for prizes	50 00
Total receipts	\$2,842 06

EXPENDITURES.

Order.

No. 1 F. L. Gardner, Elm House, executive committee	\$5 25
2 Maine State Bookbinding Company	8 53
3 L. P. Temple, photo reduction	4 25
4 W. H. Conant, expenses speaker.....	39 54
5 W. H. Conant, expenses speaker	11 10
6 H. P. Sweetser, expenses speaker.....	43 33
7 H. L. Keyser, expenses speaker.....	26 71
8 J. P. Hutchinson & Co., treasurer's bond	5 00
9 G. A. Yeaton, expenses	27 91
10 E. L. White, expenses	26 00
11 E. L. White, 6 months' salary	75 00
12 Maine Farmer Company, printing.....	6 20
13 F. K. Jack, postage	13 06
14 E. F. Hitchings, executive committee expenses.....	4 77
15 L. B. Raynes, stenographer	39 55
16 Maine Farmer Company, printing.....	6 50
17 Waterville Sentinel Publishing Co., printing.....	26 87
18 Waterville Sentinel Publishing Co., printing.....	14 65
19 Bangor Coöperative Printing Co., printing.....	42 50
20 S. H. Ross, badges for annual meeting.....	22 50
21 E. W. Mitchell, speaker, annual meeting.....	44 80
22 Samuel Fraser, speaker, annual meeting	61 46
23 W. H. Conant, judge, annual meeting.....	27 67
24 Maine State Bookbinding Co., binding.....	8 55
25 Congress Square Hotel, speakers, officers, etc.....	169 00
26 Levi S. Pennell, watchman, annual meeting.....	12 00
27 L. V. Clark, printing	3 75
28 Maine State Bookbinding Company, binding.....	13 03
29 Waterville Sentinel Publishing Co., printing.....	55 46
30 T. E. Chase, 6 months' salary and expenses.....	17 30

31	Miss M. B. Chapman, clerical work, annual meeting.	9 90
32	G. R. Pattee, DeWitt House, executive committee...	6 00
33	H. W. Shaler, Jr., lantern, annual meeting.....	10 00
34	The Brentwood Print, printing.....	6 95
35	E. F. Hitchings, expenses, executive committee.....	6 55
36	J. G. Johnson, judge	25 00
37	E. F. Hitchings, expenses	10 40
38	E. F. Hitchings, judge, annual meeting.....	32 40
39	Lyman B. Chipman, groceries for demonstration....	10 85
40	Clark-Eddy Co., sheeting, annual meeting.....	5 93
42	Chas. P. Blackwell, trucking, annual meeting.....	26 54
43	S. D. Lincoln, carpenter work, annual meeting.....	33 20
44	The Chamber of Commerce, Portland.....	25 00
45	H. P. Sweetser, supplies and expenses.....	32 86
46	H. L. Keyser, expenses	5 34
47	E. L. White, 6 months' salary.....	75 00
48	E. L. White, expenses	29 24
49	F. K. Jack, postage	36 72
50	Maine Central Railroad, freight	3 49
51	C. M. Rice Paper Co., supplies	2 45
52	A. L. Hubbard, photo	1 50
53	Banquet tickets, speakers, etc., annual meeting.....	16 00
54	M. H. White & Son, supplies	5 50
55	G. A. Yeaton, expenses	13 02
56	A. K. Gardner, judge, annual meeting.....	28 78
57	The Brentwood Print, printing	40 00
58	Premiums, annual meeting.....	513 50
59	L. B. Raynes, stenographer, annual meeting.....	62 15
60	T. E. Chase, expenses and salary	23 30
62	Merrymeeting Grange (L. P. Temple), storage.....	1 00
63	F. H. Morse, expenses	10 40
64	G. A. Yeaton, stamped envelopes.....	10 62
65	National Shoe & Leather Bank, rent for box.....	3 00
66	Transfer to permanent fund (not paid).....	

Total expenditures	\$1,985 49
Cash on hand including \$230 for transfer.....	856 57

\$2,842 06

Respectfully submitted,

THOMAS E. CHASE,
Treasurer.

REPORT OF SECRETARY.

The executive committee has been called together five times during the year.

At the first meeting in Auburn, January 5, 1916, the date and place of the 1916 annual meeting was arranged for Portland City Hall, November 14, 15, 16; also, that the society should hold a conference at Orono, Farmers' Week.

The second meeting was held at Orono, March 9, an auditing committee was appointed and matters relating to the National Dairy Show were acted upon.

At the meeting in Lewiston, June 27, the premium list for 1916 was revised and other matters in regard to an annual meeting were acted upon.

The committee was called together in Portland, October 25, to act upon matters in regard to their annual meeting.

Four conferences have been held by the Society: One in Orono, Farmers' Week, which was well attended, bringing orchardists together from every part of the state, and a great deal of interest was manifested during the meetings.

The meeting at Norway, March 21, was attended by seventy-five fruit growers. Questions were asked and a good discussion of the orchardists' problems followed the speakers.

The meeting at Farmington, March 22, was attended by fifty orchardists and interest was manifested along fruit growing lines.

A great deal of enthusiasm and desire to solve the problems of fruit growing were shown at the meeting at Standish, March 24, with an attendance of over one hundred. A great many questions were asked and discussed during the day.

The following speakers were in attendance at the meetings in Norway, Farmington and Standish: W. H. Conant, George A. Yeaton, H. P. Sweetser, H. L. Keyser, who handled questions of vital importance to fruit growers.

There should be a great endeavor on the part of the members of our Society to secure new members, striving to urge the fruit growers of Maine to gain the benefits derived by belonging to our Society, attending the meetings during the year, and our annual exhibition.

Respectfully submitted,

E. L. WHITE,
Secretary.

Voted, that the report be accepted.

The president appointed the following to receive, sort and count votes: Sidney Brown, W. H. Conant, Hiram Heald.

The following officers were elected: President, G. A. Yeaton, Norway; first vice-president, H. P. Sweetser, Cumberland Center; second vice-president, D. S. Clement, Winthrop; secretary, E. L. White, Bowdoinham; treasurer, T. E. Chase, Buckfield; member of executive committee for three years, H. L. Keyser, Greene; member of Experiment Station Council, W. H. Conant, Buckfield; vice-president of New England Fruit Show, W. H. Conant, Buckfield; delegates to Federation of Agricultural Associations, W. H. Conant, G. A. Yeaton, E. L. White.

Voted, that the election of trustees be left to the executive committee.

The committee on resolutions presented the following, which were adopted:

Whereas, the United States Office of Markets has furnished members of this society valuable information, daily, concerning the market conditions of apples, and .

Whereas, the United States Field Agent has been urged to coöperate more fully with the growers in estimating the crop of fruit for the season, be it

Resolved, That this Maine Pomological Society send a letter of appreciation to the proper authorities at Washington.

Resolved, That whereas, the Portland Chamber of Commerce has left no detail undone to make this annual meeting and exhibition of fruit a success, we extend to it a letter of appreciation for its efforts, with especial attention given to the electric sign and the public press.

Whereas, it is the opinion of this organization that the agricultural interests of Maine would be better served if it were possible to remove the election of Commissioner of Agriculture from politics, therefore, be it

Resolved, That the executive committee of the Maine Pomological Society is hereby instructed to investigate and carefully consider any bill that may be introduced at the next session of the Maine Legislature contemplating such change in election of Commissioner and, if in their opinion it will improve the present system, to give the active assistance of this organization to its passage.

Resolved, That it is still the sense of the State Pomological Society that apple storage is a live question for investigation in Maine and that a committee, consisting of the executive committee and the member from the Society on the station council, is hereby appointed and instructed to have a bill, similar to the one that has been introduced in the last two legislatures, introduced in the legislature of 1917, asking for an appropriation of \$7,500 for the purpose of construction at Highmoor Farm of an experimental storage plant.

Resolved, That an effort be made to detail more specific work for the trustees of the Society.

Resolved, That an effort be made to increase the efficiency of the apple packing and grading law.

Resolved, That regulations should be inserted in our premium list, regulating the use of exhibitors' names on packages of fruit for our annual exhibit.

Resolved, That some limit be placed in the regulations concerning the amount of fruit to be used in the exhibit for the best display of fruit, Class No. 12.

Resolved, that the appointment of judges for fruit in the annual exhibit be left with the executive committee.

Resolved, That the annual meeting be made primarily a fruit exhibit and business meeting, and that a larger portion of the funds be used for speakers of note, in meetings throughout the towns of the state.

Resolved, That an effort be made to take the matter of printing out of the hands of the state printer. This resolution is based on the unsatisfactory condition now existing, whereby the premium list and annual report are seriously delayed after being submitted.

Respectfully submitted,

H. P. SWEETSER,

W. C. ROBINSON,

D. S. CLEMENT,

Committee on Resolutions.

FACTORS THAT AFFECT THE ANNUAL BEARING
OF FRUIT TREES.

W. H. CONANT, Buckfield.

The subject which I am to discuss is a complicated one, as it treats of the growth and development of trees and the effect of the various orchard practices on maturity of tree and fruit. Since we are told that there is nothing in bud selection to increase the yield of our trees, and note that the present annual yield per tree in the State of Maine is less than one bushel per tree, we must realize the importance of this subject.

Some of the leading commercial varieties grown in this state, when planted on good orchard soil and well cared for, are producing annual yields of fruit; while those same varieties, planted on equally as good soil, but under poor management, are not producing profitable crops. So there can be no question in the mind of any commercial orchardist but that there are certain factors which influence the annual bearing of fruit trees, over which he may have some control. It is only by a careful consideration of these various factors and living in close fellowship with the trees that one may discover the limiting factor or factors in the production of fruit in the orchard.

There are many factors which may influence annual bearing in trees, but I shall briefly take up only those factors which seem to exert the greatest influence in the productiveness of fruit trees, namely: Pruning, spraying, cultivation, fertilization, conservation of moisture and cover crops.

It is not my purpose to lay down any hard and fast rules by which annual yields of fruits may be secured under all conditions, but to point out the close relationship of these factors and bring into harmony all the factors which seem to influence the annual bearing habit in trees. In doing this I can only bring you my practical experience and observations regarding the behavior of fruit trees toward annual bearing.

Many of you were probably present yesterday, to listen to Mr. Sanders, the Government crop estimate man, who has worked over the State of Maine, among the fruit growers, in an effort to work out some basis, some plan, by which we could secure a more accurate crop estimate. He said that one of the

great difficulties that he had to contend with in the State of Maine, and in other states as well, was the haphazard, slipshod way or methods employed by the fruit growers in producing fruit; that there were great variations in the yield of trees in every apple growing community. It is nearly impossible to work out any definite basis to get at any accurate crop estimate. Now that is absolutely true, that the varying conditions under which men are growing fruit in this state, are responsible, in a large measure, for the small yield or the large yield—the annual yield of many varieties, the yield once in two or three years.

I believe it is absolutely necessary that we have a plan or system by which we may start out to secure these results, and live up to that system for a term of years, sufficient to warrant some judgment or some conclusion as to what effect that system is having on the yield and quality of the fruit. So I will take up what I consider the largest factors, and perhaps speak briefly on some of the others, which may in a greater or less degree influence this annual bearing habit.

PRUNING.

Pruning is one phase of orchard work that is probably the hardest to discuss from the platform of any that we have. And it is nearly impossible for any man, whether he be a professor of horticulture or a practical man, to outline in a comprehensive manner any system of pruning, so that those who may be listening can carry home the general ideas which he intended to bring out. But we should consider the effect of pruning and have some definite object for pruning, or should do very little of it. Now then, what are the results that we start out to secure when we prune a tree? What are the reasons for pruning our trees? First, I believe it should be to keep the tree well balanced and thinned out enough to admit a free circulation of air and sunlight. Sometime during the day the sun should penetrate nearly every part of the tree. Second, we should prune the tree to be strong to carry its load of fruit with as little propping and assistance along that line as possible. We should prune to develop fruit spurs; because we can get no flower buds until we have the fruit spurs. We should also

prune the tree in a consistent way, or in a manner that will be consistent with the system that we shall carry out with the soil under the tree. These factors are closely related to each other, and to avoid any overlapping of these factors it is important that they be considered in this manner, I believe. We know that by a severe pruning the tree will endeavor to reproduce itself in wood growth; that overpruning in any one season tends to develop a larger wood growth; that by stimulating this wood growth, it does so to the neglect of the fruit spurs and also fruit buds. This is the way it works out in practice in a great many cases. I believe the tree should be pruned annually, taking out the crossed limbs or any diseased wood that may appear in the tree, keeping it open to the sunlight and air. Doing this once a year, you won't throw that tree out of balance with the root system, the idea being to maintain as nearly as possible a balance between growth and fruit. I think it is one of the fixed laws that is well understood among fruit growers generally, that growth antagonizes color, and by getting a reasonable growth on the trees every year, we are assured of a better quality of fruit or of mature fruit at the close of the season. Therefore, it is only by having a definite plan and system and considering these together that we can regulate these various factors.

SPRAYING.

Why do we spray? What is the object of spraying? If we are to get the best possible results from a tree, it is nothing more than reasonable to expect that the tree must be in good condition all the time if it is to do its best in the production of fruit. So we must spray. It has been demonstrated over and over again in the State of Maine that we must spray to protect the trees from bark-sucking insects, leaf-eating insects, and the fungus diseases that are coming to us nearly every season. If we allow these insects and the fungus diseases to destroy the foliage, which are the lungs of the trees, we have seriously interfered with the productiveness of the orchard. So it is absolutely necessary to spray. It is a large factor in the productiveness of the trees, that we maintain a healthy, clean foliage from the time it emerges in the spring until it falls in the

autumn. Just an example of this. I left off the dormant spray one spring as an experiment, thinking that we might possibly omit this spray and yet come in with two later sprays, the pink-bud and the codling moth spray, and cut down a little expense. Well, the leaf blister mite came in upon those trees which I did not spray with lime-sulphur and took nearly one-half the foliage from the trees before the 30th of August. Now that had a very damaging effect on those trees. It was two years before they began to get back into condition again. So I state this to show that it is important to maintain a healthy, clean foliage on the trees if you expect them to do their best in the production of fruit; also to secure fruit of quality—marketable fruit. I would like to say right here, this last spring the prospects for the marketing of our crop this year looked so bad—it is not only so in Maine, but in Canada, and in Annapolis valley—men were so discouraged at the outlook that they neglected to spray their orchards, with the result—this is particularly true in Canada—that what fruit they had this fall was not fit for market and that thousands of barrels of Maine apples were shipped into Canada to supply the demand for this year. This was brought out forcibly in my own vicinity, men who didn't have the courage to get out the sprayer and spray every fair minute have lost in the apple game this fall, at marketing time. So this is a great factor in the production of fruit trees.

CULTIVATION.

What effect has cultivation on the trees? How are we going to cultivate? When are we going to cultivate? When shall we stop cultivation? These are the most important questions, I believe, that can be considered by many fruit growers, since there are several who have no definite plan. In our vicinity the effect of early cultivation upon the productiveness of the trees and health and general vigor is having wonderful result. Our seasons are much shorter here than in Massachusetts or Connecticut, so that it is important that these trees start out as early in the spring as possible. I find, under my conditions, the earlier I can get into the orchard in the spring and begin to stir the soil and warm it, the earlier those trees start their annual growth. It is so every year. I believe that we should

start in on tillage early in the spring, and start a strong and vigorous growth on the trees as early as possible. And not only that, but conserve the soil moisture. Cultivate that orchard, depending on the moisture conditions, up to July 1.

FERTILIZATION.

In connection with this cultivation comes the next important thing. It has never been considered necessary to have any definite plan as to what we should do along the lines of fertilization. This question has been discussed from the New York standpoint and from a Pennsylvania standpoint, and those people from the different states cannot agree on any plan. It has been discussed pro and con, the same as the different methods and times for spraying applications, until I want to state here—to make it very definite—that these problems are in many cases, and in most all cases, local problems. The spraying calendar that will apply to western New York will not apply to Maine; a spraying calendar that will apply in Annapolis Valley in Nova Scotia will not apply in Maine; and any system of fertilization or any particular formula for fertilizer, or brand of fertilizer that might apply in some other states, may not apply to Maine conditions. I think this thing has been threshed out and results secured by many of our growers, and I state this after making observation in every part of the state. Wherever I go I never lose a minute or an opportunity to get in touch with what is being done and to get right down to the bed rock, and to find out the reason why this thing is so and so. So that fertilization, I believe, is something quite important to us, as being a factor in connection with cultivation toward productiveness, the annual yield or biannual yield of fruit here in Maine. I think further, it has been demonstrated in my own county that a little fertilization, and only a little, is mighty beneficial to our orchards. There is a tendency on the part of many of our growers to overdo this fertilization question, and there is a like tendency on the part of some of them to under-fertilize their trees. There is a tendency on the part of a great majority of our growers to treat all varieties under all conditions the same. And it is impossible to get along in this haphazard way without taking into account the demands of the

trees, the variety we are growing, and get the results, we are really after and which are not a great way apart. I have seen it demonstrated, over and over again, that what will apply in one town will not apply in the next, and that soil conditions and moisture conditions on the same farm, or in the same neighborhood, do not compare at all, therefore it is an individual problem. I wouldn't go anywhere in the state or out of the state and attempt to tell the growers in those different localities how they should fertilize their orchard. But I think we can discuss effects of fertilization, and the reasons why we should fertilize, for fertilization is necessary.

When are we to fertilize? With what are we going to fertilize? What are the elements of plant food we are to use and what effect are those elements going to have on the growth and development of the tree and the maturity of both the tree and the fruit? Now there is the thing in a nutshell, and by overdoing, carrying to excess one or two of these factors, we may have defeated the whole proposition that we are working for. This has been done, over and over again, and probably will continue to be done, until people stop and consider the effects of things, and not say, "I am going to do this this year." For instance, some men will give an orchard a heavy coat of barn dressing, and the next year will say, "Well, I fertilized it pretty good; this year I will give it some basic slag, and if that does not respond, if it does not look just to suit me, I will use a coat of lime. I believe it wants lime," or something like that, and so goes on from one thing to another, and the trees are growing first, all to wood, and then to fruit, and there is no mature fruit produced on the trees. Now there must be a pretty close relationship between maturing fruit, and fertilization and cultivation. It may be of interest, perhaps, in this connection, to sidestep the subject just a little. The people who have come to us for carloads of apples and trainloads of apples in the past four or five years have wanted and always demanded mature fruit and the trade that those people supply with fruit, demand mature fruit. And I think, commercially, in this state the fruit grower is certainly in the wrong who does not try to grow mature fruit and see to it that when it comes fall he has mature fruit to offer. Mature fruit will be fairly well colored, at least; it may be highly colored. Now to get back to the real

topic again: How are we going to fertilize? It is important that we know what the brand of fertilizer is and when the bulk of nitrogen in that fertilizer formula is going to be exhausted, and that will tend to check up the trees. Instead of using ground bone, and barnyard dressing to excess—there are times when we can use it and I have seen good results from the use of barnyard dressing. I am not throwing that down as a fertilizer, but the best results from its use I have ever seen secured in my section of the state was when they applied it the last day of October on top of the ground, leached fifty per cent to sixty-five per cent of it down the row. The trees did not get an excess of nitrogen, but just enough, and the grass the next summer would take up a lot more of it, and they got just enough to stimulate them to some growth, and being in the sod, they matured nice fruit. That is the best result I have ever seen with barnyard dressing. Applied with cultivation that we talked about, if too large an amount of the dressing is applied, it will throw the tree entirely out of balance and secure a tremendous growth on the trees to the neglect of the development of fruit spurs or fruit. When the tree is making too much growth and there is fear of immature fruit, I believe then is the time to go in and stop it as soon as you can with a cover crop. Under Maine conditions the nitrogen in an orchard fertilizer should be in an available form; at least one-third of the nitrogen should be in the form of nitrate of soda and the balance in dried blood or tankage. When the tree has made sufficient growth and is bearing fruit, then check that growth; do not hesitate to sow a cover crop under the trees, stopping cultivation. You will find nearly every year those trees begin to check back, and at the harvest you have mature fruit such as you are not ashamed to show to an apple buyer. So the cover crop comes in there to be a factor. Why? Because it takes up the surface moisture and some of the available nitrogen near the surface. What kind of a cover crop are you going to put in? That depends on your conditions—the amount of moisture. If it was in drought I should want a very light one. It might not be necessary to put it in quite so early if it was an extremely dry season. But with plenty of moisture and the trees looking right, I would not hesitate to sow a crop of oats, if I thought there was danger of their going too far over toward wood, for

fear of immaturity. I have used quite a lot of buckwheat. It makes a very good cover crop under our conditions. I might say that I have never seen a case where clover, in our country up in the hills, ever got a stand sufficient to be worth while as a cover crop in Maine. I would advise men to try out these different things under their conditions. But first, try something light, like rye or buckwheat. And in case the trees were getting too heavy I would not hesitate to use a crop of oats and turn them under the following spring. In dry seasons, in fact, every year, the moisture is a large factor in this annual bearing. I think we have never appreciated what soil moisture does for an apple tree, in producing the wood growth and also good sized fruit, but I believe it should be controlled to some extent in the latter part of the season. A cover crop helps take care of the surplus moisture and seems to get the trees into condition where they can mature their fruit. What little I have said to you refers to the cultivation—tillage system we might term it. You can get these same results, men are getting these same results under different conditions, or under certain conditions in the state under what they call a mulch system. It seems to lighten the soil and make available this plant food quickly. The fertilizer sown into the mulch leaches down into the roots of the trees. It is rather expensive, I think, and if once adopted must be lived up to. But you can get results.

CONCLUSION.

In closing I want to tell you something about a little of my own practical work with a block of Northern Spies, fifty-four in number, standing on an acre, planted too thick. Those trees are about thirty-five to thirty-eight years old. They have produced apples for the last seven years. Those trees are cared for and looked after, and I try my best to see that they have just what they seem to need, with the result that under these varying climatic conditions that we have had for the past few years, those trees have come out with wonderful success. The largest crop taken in the seven years was 250 barrels, the least was 100 barrels, taken in 1915, when we had a frost on June 3 that took off a large percentage of the young fruit then set.

But in the seven years, gentlemen, those trees have borne every year, and the total is 1191 barrels from the 54 trees. This year we were unfortunate in having a hail storm, August 23, which cut the fruit, but after that a man came from Canada into that orchard and he wouldn't let the manager of our exchange alone until he had bought all the fruit from that orchard to ship to Canada. The yield this year was 198 barrels, after being cut by the hail storm, and sold for \$645. It may not be possible to do in every case these things that I am telling you about, but I do know that there is nothing that will respond to the right kind of treatment so readily as an apple tree. It is only when we can get right down and talk with that tree, think with it, watch it and control these things that come in to weaken its vitality, that we get the best results in orcharding. It should be the aim of every man who is growing apples, commercially, to take care of his trees and keep them in as good condition as possible and, in addition, bring into harmony all these factors—never neglecting one. Pruning is important. Spraying is absolutely necessary. Cultivation and fertilization assist these first two factors, and the conservation of moisture and the cover crop all play their little part in assisting nature to produce annual yields on those fruit trees. All brought into harmony, you are sure to get better results with the trees. I thank you.

THURSDAY AFTERNOON.

GROWING AND MARKETING OF APPLES.

E. W. MITCHELL, Stuyvesant Falls, N. Y.

When your president asked me to address your meeting and gave me the "Growing and Marketing of Apples" for a topic, he certainly gave me a broad field to cover. It is a subject so large and with so many different aspects and details that it would take a long time to do it justice. However, it is my purpose to make a general survey of the field and then try and answer more in detail any questions you may care to ask on any particular part that may interest you. As I understand that the apple is the fruit you are particularly interested in, I will confine myself to that one fruit.

SOIL.

Almost any apple will grow on almost any soil, but it is generally agreed that red varieties color better on sandy or gravelly soil, than on the heavier types, and that green apples grown on heavy soil, keep better, and lack the blush that is undesirable in many markets. The color is closely related to the degree of ripeness of the fruit, and as apples on a light soil or in sod usually mature earlier than those on clay or under cultivation, so will the former usually show better color and drop earlier, and ripen earlier in storage than the latter. Good color is desirable in colored apples, but often the late spring market will pay a premium for small, green Baldwins, for instance, because they look green when most offerings are over-ripe.

An elevation protected from high winds but having good air drainage is desirable for planting, for it gives not only protection from frost but also from apple scab and other fungous diseases.

The mistake has often been made of planting the orchard on the poorest land on the farm. Competition in the fruit industry is keen and is growing keener every year and only those producing fruit of high quality are going to find it profitable. To produce good fruit on an economic and commercial basis you want all the advantages you can get, and that includes good, well drained, fairly level soil, that can be worked at the minimum expense. When you consider how small is the rent or interest on the investment of the land, compared to the cost of the trees and the annual expense of care and cultivation, it is surprising to see how many people are looking for cheap land, rather than the best land that money can buy.

VARIETIES.

The question of what variety to plant can be answered better by a local grower than by any one coming from the outside. I prefer the red apples to the green or yellow varieties, because they do not show the effects of apple scab or bruises, or scald so plainly, and I have always felt that a red apple shows up better and meets a better and wider demand on the market than a green or yellow one.

I am only sure of two points regarding the choice of varieties. First, choose those that are standard and well known; second, do not plant more than four or five varieties. Pardon me while I illustrate this from my own experience.

In the Hudson Valley the soil is mostly sandy loam; we have a long growing season with plenty of sunshine and seldom have much scab. Our nearest and best market is New York City, which has a large fruit stand and peddler trade. Under these conditions the Ben Davis is my most profitable apple. I see some of you smile, but listen, every year I have had a large crop of Bens. The stand men in New York take these and polish them day after day in their customary way—the fruit shows no signs of wear. On cold days the apples become frozen a little and thaw out at night, when the stand is closed. This only helps to mellow a Ben and sooner or later somebody comes along that sees a big red apple and Ben is sold and sometimes even goes into consumption. The Ben can almost always be placed for export trade, especially to South America, and, when the Virginias are out of the way, is a good apple for southern trade. A good run of Ben Davis can be picked, sorted and packed at less expense than any other apple. They have good size and generally good quality, and the windfalls can generally be sold to good advantage. However, I would not advise any one to plant Ben Davis. I think its popularity and usefulness are on the wane, and besides that, the Central West and Virginia can beat any other section at growing this variety.

The Baldwin is our best and most standard apple. The buyers come for the Baldwins and take the others, if they have to. Fall Pippin does well, but Greening develops a blush that makes it look riper than it really is and our Greenings have to take second place to those from Western New York, grown further north on a heavier soil and without the blush. Our McIntosh can not class with those grown further north, either in color or quality, and Winesap and Jonathan fall far below those from Virginia, Pennsylvania and the Central West. Alexander, Fall Pippin, Baldwin, and Ben are a combination that are hard to beat for our conditions in the Hudson Valley.

My farm has twelve kinds of apples on it; another of 30 acres I manage has 23; and another of 100 acres has 25—one

ten acre block of which is planted in alternate pairs of rows, standards with fillers on the diamond—altogether, 15 different varieties on ten acres. Now different varieties differ some as to cultural and soil requirements and methods of pruning, as to time of spraying and picking; think of the expense of going over and over such an orchard for spraying and picking, if it is done properly, and the loss in quality if it is not done properly. Too many varieties mean more work than the regular farm help can do, and not enough to warrant the putting on of an extra crew of men, and is just as bad as having too many cooks in the kitchen. Some plantings have been made with a few trees of a great many varieties with the idea of employing a small amount of labor throughout the season as the fruits ripen in succession. This seldom happens to work out well in practice, because the varieties will vary as to annual bearing and the amount of fruit borne.

CULTIVATION.

This question will always be up for discussion, because we will always be looking for a way to avoid plowing and cultivation, or else for an excuse for not working the land. Cultivation does two things—it liberates plant food and makes it available for the trees, and saves the moisture. If an orchard is on deep, rich soil, that is naturally well supplied with moisture, the trees will probably do well in sod, and the grass may even be a benefit to use up any excess moisture, but under average conditions, cultivation almost always pays. The use of a mulch of straw or cut grass helps conserve moisture, but has two bad points. It gives shelter to mice, and, if it catches fire, the damage to trees is apt to be serious.

Cultivation serves two other purposes; it helps prevent winter injury. The tree has a season for growth, ripens its tissues and then is dormant for a period. If the spring is late and dry, or a long dry spell in summer is followed by a warm wet fall, the tree is apt to begin growing too late to ripen well before winter, or may start a second growth that will not ripen before cold weather. Early cultivation followed by a cover crop is the best means I know of to control the growing period of the tree. Cultivation with pruning and thinning may be used to regulate the bearing of the tree.

To bear fruit the tree has to perform two distinct operations; form the bud or embryo one year, and fertilize and mature the fruit the next year. I believe the forming of the bud requires about as much food and effort as to mature the fruit, and a tree that is feeding a big crop of apples cannot, as a rule, take on the burden of making fruit buds at the same time; and so, many trees bear only every other year.

I am pretty well convinced that if you prune some of the bearing wood of an orchard, during the winter previous to its crop year, thin the fruit early if there is still a heavy crop, and give the orchard extra good tillage, you will get fruit buds formed for a small crop in the off year. The off year when the tendency of the tree is to form too many buds, do not thin or prune and hold up on fertilizer and cultivation to check the forming of the buds.

This method cannot be followed blindly, but by watching the trees and formation of buds and fruit you can usually influence the trees to quite an extent. Here are the records of blocks of trees worked after this method:

BLOCK NO. I.		BLOCK NO. II.	
1910.....	1098 barrels		
1911.....	1480 "	923 barrels	
1912.....	1552 "	557 "	
1913.....	2381 "	765 "	
1914.....	3482 "	581 "	
1915.....	1905 "	847 "	

SPRAYING AND DUSTING.

We have two enemies to fight—plant diseases and insect pests, each of which may be divided into two groups; the former into bacterial diseases and fungi, and the latter into sucking insects and chewing insects. Fire blight and collar rot are the two principal bacterial diseases, and with them I want to class old cankers or rotten limbs. The only protection from them is to avoid breaking the bark on the tree and painting any wound there may be. The only cure is to cut back into healthy tissue and clean out the wound and paint it. I like coal tar or asphalt tar better but have used lime-sulphur, followed by ordinary paint.

Of the fungous diseases, apple scab, sooty blotch and fruit spot are the worst. The fungus has a seed or spore which is blown upon the leaves or fruit and germinates when there is a drop of water there to grow in. This seed sends a little root into the leaf or fruit, and once inside, is safe from spray, and beyond our control. The only control measure we have is to have the leaves and fruit covered with sulphur or Bordeaux, before the spore and the water get to coöperating against us. It is harder to tell when the spores will be sown than it is to predict rain, so we must choose the lesser of two evils and spray before the rain and before the first infection takes place. The spores are sown at different times throughout the season, but the scientists have pretty accurate knowledge of the time of the first infection, and the number of sprayings needed to effect good commercial control in most instances. The main point in fighting a fungous disease, then, is to have the tree protected before the raindrop or heavy fog or dew comes to germinate the fungous seed. If the sulphur or copper sulphate is on the leaf first, the rain will dissolve enough so that the little root is blasted when it comes out of the spore to enter the leaf and the fruit is protected from injury or later infections from fungus on the leaves.

Our insect enemies are of two kinds—those that chew and those that insert the beak and suck sap from inside the tissues. The codling moth and tent caterpillar are examples of the first, and the aphids and scale of the second group.

Arsenate of lead is now the generally accepted poison to kill the chewing insects and this should be applied before the insect begins eating, or, at the least, when the insect is very small.

For the sucking insects, we have to wait till they are on the tree and then use a caustic spray such as lime-sulphur that will burn them to death, or a soapy spray that will cover their breathing pores and smother them, or some form of nicotine. Here, then, is a list of our ammunition:

Sulphur for fungi.

Lime-sulphur for scale.

Arsenate of lead for chewing insects.

Soap or tobacco, or both, for sucking insects.

The chemists have given us plenty with which to fight, and the scientists have worked out the plan of campaign; but no

one can spray successfully till he has learned to recognize the enemy and knows his habits. Spraying costs a lot of money and it is apt to be wasted if you don't know why and when to do it.

Spraying, we will admit, is a mean job; when the land is soft and the engine or pump do not work right, and when the well runs dry, the average man feels like quitting and going out to plow, especially if he is in a hurry to get ahead of an approaching storm or to get done before the blossoms close. Those are some of the reasons why men have taken up dusting as a substitute for some of the spraying operations.

DUSTING.

Now, logically, there is no reason why the same materials can not be blown on instead of sprayed on. The only difference is, that air is used as a carrier instead of water. The chemical nature of lime-sulphur, Bordeaux or lead is not changed by the addition of water and the same materials blown on the tree are held there by the fine hairs that cover the surface, and are moistened and set fast by the moisture from the atmosphere. In the experiments conducted by Cornell, and in all the dusting I have done, the dust has proved to be as practical and as effective as the spray, when both were applied with equal thoroughness. However, in the last two years I have had uniformly better results from dusted blocks than from sprayed, because it is easier to do a thorough job with the dust. You can find the details of the dusting experiments in Cornell Bulletin No. 369, and Extension Bulletin No. 1, but the conclusions from the work are, that you can dust from four to ten times as fast as you can spray, and the cost of materials, though slightly greater for the dust, is not enough to outweigh the saving in time and labor.

Here are some of their figures, averaged and condensed for the sake of brevity and clearness:

For control of apple scab—

Check plot untreated	40 %	scabby apples
sprayed	5.4%	“ “
dusted	7.6%	“ “

Codling Moth—

Check untreated	24.3%	wormy apples
sprayed	7.4%	“ “
dusted	3 %	“ “

Costs—Two men and a team in one day can do what three men and a team need from four to ten days to accomplish.

Cost of materials per tree when sprayed, 4.3 cents.

Cost of materials per tree when dusted, 7 to 10 cents.

These figures are based on experimental work and an application of about two gallons of spray or two pounds of dust per tree, and a dust running about eighty to eighty-five per cent sulphur and twenty to fifteen per cent lead.

My experience with dust, used commercially, has been that first, you may often dilute the dust with lime or gypsum, and, second, need not make so heavy an application. A block of 418 Baldwin trees twenty years old and well grown took only two hundred and fifty pounds of dust, made fifty per cent sulphur, ten per cent lead, and forty per cent gypsum or six-tenths of a pound per tree at a cost for material, of three and six-tenths cents per tree. I had a boy to drive the team; we drove slowly and made a very thorough application, from both sides, and it took us just three and one-fourth hours, or a cost of seven-tenths cent per tree or a total of four and three-tenths cents per tree. Last year, I made one application; this year, two; and the apples, as a whole, ran better than any other block, either sprayed or dusted, that I know of.

The dusting must be done thoroughly from both sides, and there are many little points to be learned from experience only, but I believe it is a step forward in disease control, and worthy of a trial.

On the marketing of fruit I want to be very brief although I consider it the most important problem before our Eastern fruit growers, today. We must put out a reliable brand of a staple article, in sufficient quantity to bear the expense of proper advertising and selling. We must govern the distribution and use of the inferior grades, by shipping in bulk cars or to factories, in order to protect our customers from inferior goods, and our good stock from low prices. This can only be accomplished by mandatory state grading laws and by coöperative packing and selling.

Mr. TRUE: When do you apply those two sprays?

Mr. MITCHELL: The first dust I put on when the petals have fallen from the blossom, that is, the first codling moth dust, and if I am not in much danger of an infection from scab I use fifty per cent sulphur, forty per cent lime and ten per cent arsenate of lead. In a section such as Maine or Western New York I think it would be safer to put your sulphur up to seventy or possibly eighty pounds, your arsenate of lead ten or possibly fifteen and your lime only five pounds. But the applications that I have made have been for the first brood of codling moths when the petals fall; the second brood, about three weeks later, depending on the time they hatch. If you do not apply the dormant spray late to prevent scab, you should make an application of sulphur for it, and possibly put in arsenate of lead for bud-moth and other things, if you have them. It is up to the grower to determine what you have to fight.

Mr. BROWN: I would like to ask you, Mr. Mitchell, how you regulate the speed of the apples running into the grader?

Mr. MITCHELL: I have a big sorting table that holds ten bushels, the apples are put on the table and run down in front of the packers, and the packers stand and throw out into barrels anything that is not a perfect apple, and they feed it upon the machine from tables that run from either side of the machine. Sort them and put them on the machine, throwing the ungraded outside. You can feed this machine very fast—about three hundred barrels a day. The arrangement of the tables is a matter of detail. The construction of the sizer is the main part.

Question: When you added the gypsum to the sulphur and the arsenate of lead, had it any chemical value?

Mr. MITCHELL: No, the gypsum and the lime are inert. They have no chemical effect upon the other ingredients of the dust. The reason they are added is this: Sulphur is very heavy, the arsenate of lead is rather heavy, and if you take a dust made of eighty or eighty-five pounds of sulphur and fifteen pounds arsenate of lead, it goes very fast. You make a heavier application than I think is necessary, and take sulphur costing \$2.75 a thousand and arsenate of lead \$22 a hundred, and lime only costing about \$15 a ton, you get to economizing. Your lime dilutes your dust mixture as water dilutes your

spray; and furthermore, the lime is bulky, fluffy, and helps in the spreading properties of the dust. To illustrate that: We never have much codling moth on our pears, and I thought, for an experiment, I would dust some pears with a mixture made of five pounds arsenate of lead and ninety-five pounds of hydrate of lime, and when I went out to dust with that mixture I found it was so light and fluffy that we could not get on enough. I had to add gypsum which is a little bit heavier, and I had to add a little bit of sulphur in order to give it body enough so that we could make an application. Now, with tobacco, the snuff is very light and fluffy, and with tobacco you will find, probably, that a little sulphur or a little gypsum is necessary rather than so much lime, because the lime and tobacco being fluffy, make a very light mixture that it is a little difficult to blow.

Mr. SWEETSER: What sort of weather conditions do you require for using the dust spray?

Mr. MITCHELL: The weather conditions for dusting are exactly the same as those for spraying. As I illustrated with fungus, the seed will not germinate until it gets a drop of moisture. It is important for us to get on the spray immediately before the water and the spore coöperate to get into the leaf. Therefore, often it is necessary for a fruit grower to spray just before a rain. He has to watch weather conditions and try and beat the rain. Now, in spraying, you know if it rains your spray washes off a little, in fact, it washes off almost as fast as you put it on, and it is disagreeable to work in the rain, and although you can spray against the wind it is very difficult, very unpleasant, and you seldom get a good application. Dusting is exactly the same. You can dust when it is raining, but it is not a pleasant job and the dust washes off—not entirely, but it washes off some, just as spray does. You can dust against the wind about as well as you can spray, but it is very disagreeable and you do not get a good application. The matter of dew has often been spoken of and, personally, I prefer to dust trees when there is dew on them, but all the experiments and all the observations that men have made have gone to show that the dew has no practical influence on the sticking qualities of the dust; that the dust

stays on just as well with the tree dry as if wet with dew. So that the weather conditions with dusting are no different than with spraying. But it has this one advantage, that you can dust ten times as fast as you can spray. You are not a slave to the weather. If it takes you two weeks to cover your orchard with a blossoming period of ten days, you have got to hustle. On the other hand, if you go out and do that same work in one or two days, you can choose your weather very much easier than you can when you have to go out and cover them with the sprayers.

Mr. SWEETSER: Can you buy these dusters on the market?

Mr. MITCHELL: Yes, these dusters are for sale. Would anybody like the names of the companies?

Mr. YEATON: I think we all would.

Mr. MITCHELL: The Dust Sprayer Manufacturing Company, or better still, William L. Terhune, Waterville, N. Y., is the agent for the Kansas City duster. The Niagara Sprayer Company at Middleport, N. Y., puts out a complete line of dusters and dust. The cost of these dusters is \$95 for the large duster which takes about three and one-half horse power engine to run it; \$45 for the medium sized duster, takes about a two-horse power engine to run; and \$25 for a little hand duster. With a little hand duster on young trees, not over ten years old, you can do very satisfactory work. I might say that on hillsides, or with soft land in the spring, the duster will prove a great boon, because you can put it on a stone boat or a very low wagon and go almost anywhere with it. The duster weighs, I think, about 250 pounds. Two of us, I know, lift the duster on and off the wagon without any trouble; and the weight of the engine will vary according to the kind of engine you have. But the weight of materials for dust working for a day's work is only about 500 pounds. Load your wagon with 500 pounds of dust and it will keep you going nearly a day.

Question: What kind of an engine do you use?

Mr. MITCHELL: I have a Sears-Roebuck engine. I have had a great many engines and pumps; but I have a Sears-Roebuck economy engine and a Lucas pump sold by that company.

Mr. SWEETSER: May I ask what is the equipment from the machine—do you carry the dust through hose and extension rods and nozzles as we do the spray?

Mr. MITCHELL: No, the equipment is simply this: Here is an iron hopper which comes as far as this flexible joint. Now the ideal duster has a flexible joint made with little short sections of tin—just as they used to make armor in the old days, little pieces of tin lapped over each other, covered with a piece of bagging. The Niagara people put on a big rubber hose there. This outlet pipe is made of corrugated iron, and that corrugated iron is from six to eight feet long, in two heavy sections. You can make it just as near as you want. Where the trees come close together I cut it down to four or five feet; when trees are high, sometimes ten or twelve feet, simply point it at the trees, wave it as you pass. You may be ten feet away from the tree, five or ten as the wagon goes by; you sweep the dust all over the tree, and then down through it, and then underneath, so that it goes up under.

Mr. SWEETSER: Do you calculate in that way you can cover the tree as thoroughly as we deem it necessary to cover with spray?

Mr. MITCHELL: In my experience we cover it better.

Question: We have been practicing going clear round the tree, following out every limb with the spray nozzle, especially spraying for serious infestations of scab.

Mr. MITCHELL: It has been my experience that you get a more even distribution with the dust than you can with the spray even by going over every limb, and it has been the experience of the Cornell sprayers. I might say that in western New York, a great many men are disappointed with the dust, but I will venture to say for every man disappointed in results with dust, there are one or two hundred disappointed with the results of their spraying, and unless you get data from carefully conducted experiments by some of the stations or colleges, nothing can be taken as accurate. Those sources of opinion, the experiment stations and the colleges, are reliable and you can bank on what they put out, because it is pretty carefully worked out. My experience has been very successful. I might add this, that this year it was simply a question of the

day that the mixture was put on. An orchard dusted one day was perfectly free; an orchard dusted about a day later, after a little rain storm, was peppered.

Question: Was that because the dust washed off?

Mr. MITCHELL: No, sir; because the rain got there a day before the dust and infection took place before the dust got there.

Question: Have you had experience in controlling the oyster shell bark?

Mr. MITCHELL: We have never had experience except as we sprayed for San Jose scale. Seven years ago my orchards were badly infested with scale and we sprayed them thoroughly and cleaned up most of the scale the first year; we sprayed them again the second year and cleaned up the rest of the scale; then I sprayed for three more years, and the last two years I have not sprayed any.

Mr. YEATON: What material did you use?

Mr. MITCHELL: Lime-sulphur.

Mr. YEATON: Have you ever used any oil?

Mr. MITCHELL: I have never used any.

Mr. YEATON: Would you be afraid to?

Mr. MITCHELL: I do not know—I am not afraid of many things. I have ten gallons of oil, probably the oil that you are thinking about, in my barn, that I expected to try out so that I would know, but we were so busy that I did not take the time to use it. I have never used any oil except one tankful I sent out and it did not mix up right so we dumped it. I have used kerosene emulsion for aphids. This year we did some dusting for aphids. Is that much of a trouble up here?

Answer: It bothers us a great deal.

Mr. MITCHELL: Now when dusting for psylla we passed a couple of trees badly infested with aphids. We stopped to shoot them just before noon. We went to the barn, unhooked the horse, and came back twenty minutes later, and found almost all of them killed with fifty pounds of tobacco snuff and fifty pounds of hydrate of lime, a mixture that to apply costs a cent a tree for material and a cent for labor, about two cents a tree to apply it, and it just wiped up the aphids.

Question: I thought they had to be soaked?

Mr. MITCHELL: They got soaked with dust. It is very much easier to soak an aphid with dust than liquid because the liquid runs off from him. Have they used much oil in Maine?

Mr. YEATON: Haven't used much of any. The oyster-shell bark louse became more numerous last year than ever before. Orchards thoroughly sprayed with lime-sulphur are now overrun with bark lice.

Mr. MITCHELL: We haven't had any particular trouble from it. We occasionally find a few. Most of my orchards haven't had a drop of spray for two years, just the dust. I imagine lime-sulphur in a dormant period is the only thing that would check them.

Mr. BROWN: Do you use a dormant spray, as I understand? You can use the dust for a dormant?

Mr. MITCHELL: No, you can't use the dust for dormant spray. I have omitted the dormant spray for two years, except the experimental plots. We haven't had San Jose for two years.

Question: You will have to use dormant for that, won't you?

Mr. MITCHELL: I think so, to clear up the scale again and make sure against the first moth—a good cleaning up for a sanitary measure, and if that doesn't reappear, then I can go a couple of years with just the dust, but for a dormant spray, you have still to stick to whatever you have been using.

Mr. FRASER: If any one has a garden and has rose bushes with aphid on them, and they want a cheap duster, take a piece of cheese cloth and put the mixture in it—it is the cheapest duster made, no patent on it. We use it all along the nursery rows where our small buds are affected with aphid.

Mr. YEATON: What do you use inside the cheese cloth?

Mr. FRASER: Tobacco dust, the cheapest thing of all.

Mr. TRUE: Is there any control for the trypet?

Mr. MITCHELL: That is what we call the railroad worm. The only thing you can use for that is arsenate of lead, and the applications of arsenate of lead as they have been made have not proven very successful. Of course, general sanitary measures are good and arsenate of lead helps some to this end. A good many orchardists have plenty of railroad worms in spite of that.

Question: Have they controlled it with the sweetened arsenate of lead?

Mr. MITCHELL: Better than they can with the ordinary applications. But if you are bothered seriously with that, take molasses and water with arsenate of lead, about a gallon of molasses to thirty or forty gallons of water and a couple of pounds of lead, and mix that and spray it on the lower limbs, because most of the eggs are liable to get on the lower limbs, and sweetened arsenate of lead is more effective with the ordinary spraying.

Mr. YEATON: I will say right here that I have been working on that control of the trypetta for the past four years, and that the spraying with the arsenate of lead has had a very wonderful effect in controlling. Last year, where the orchards were affected badly, the block that I had under experiment was entirely free. This year I had no trypetta in the whole orchard. In fact, we have had less in Maine this year than for a number of years. It is due to a parasite and a fungous disease that got at the fly—the trypetta this year, that it is lessened so.

Mr. MITCHELL: Was that sweetened arsenate of lead you used?

Mr. YEATON: I tried it with both, the sweetened, and the arsenate of lead without the molasses. The molasses seemed to stick it rather better, but I saw no difference in the control.

Question: Will the dust spray kill the woolly aphis as well as the green aphis on the apple tree?

Mr. FRASER: I don't know.

Mr. MITCHELL: Nobody knows that yet so far as I know.

Mr. FRASER: We hadn't enough woolly aphis to try it this year ourselves.

Mr. MITCHELL: Get a little dust, in a handkerchief, and dust it on some woolly aphis and watch it. Anybody who is interested can take a little hand atomizer and put in it either a spray mixture or a dust, whatever you want to blow, and blow it on and get a little magnifying glass and watch your insect or fungus and see what it does. It doesn't cost you much. And in that way you save hundreds of dollars, sometimes.

Mr. FRASER: Don't buy one of the hand dusters that is made. We have had lots of them to try. There isn't one of them that will last twenty minutes.

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